Advances in Decision-Support Frameworks for Emergency Response and Public Health Resource Allocation

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Abstract

Effective decision-making in emergency response and public health resource allocation is critical for mitigating risks, optimizing resource distribution, and ensuring timely interventions during crises. Traditional decision-support systems (DSS) have evolved with advancements in artificial intelligence (AI), machine learning (ML), and big data analytics, enhancing real-time predictive capabilities and resource optimization. This paper explores recent developments in decision-support frameworks that integrate data-driven methodologies for improved situational awareness, response coordination, and resource allocation. Modern DSS leverage geospatial information systems (GIS), agent-based modeling, and deep learning algorithms to analyze large-scale epidemiological, demographic, and logistical datasets. These technologies facilitate dynamic risk assessment, scenario planning, and adaptive resource deployment. Additionally, cloud computing and Internet of Things (IoT) devices enhance data collection and processing speeds, enabling faster decision-making during emergencies such as pandemics, natural disasters, and bioterrorism threats. A critical challenge in emergency decision-support frameworks is balancing equity, efficiency, and scalability. AI-driven decision models incorporate multi-objective optimization techniques, ensuring fair distribution of medical supplies, personnel, and critical care facilities. Moreover, hybrid models integrating reinforcement learning and Bayesian inference improve predictive accuracy and robustness against uncertainties. This study reviews case applications of AI-powered DSS in pandemic response, hospital surge capacity management, and vaccine distribution. Key lessons from COVID-19 illustrate how predictive analytics and real-time dashboards enhanced public health responses. Ethical considerations, including data privacy, algorithmic bias, and the need for transparent decision-making, are also discussed. Future research should focus on integrating explainable AI (XAI) into DSS to enhance interpretability and stakeholder trust. Additionally, blockchain technology holds promise for securing data integrity in decentralized emergency management systems. By advancing decision-support frameworks, policymakers and healthcare practitioners can develop resilient, adaptive, and efficient emergency response strategies to safeguard public health.

Keywords: Decision-support systems, emergency response, public health resource allocation, artificial intelligence, machine learning, predictive analytics, geospatial analysis, pandemic response, healthcare logistics, reinforcement learning.

1.0. Introduction

Decision-support systems (DSS) are integral to emergency response and public health resource allocation, as they facilitate data-driven decision-making, enhance situational awareness, and optimize resource distribution across various crisis scenarios, such as pandemics, natural disasters, and bioterrorism threats. The emergence of these systems is essential for enabling timely and informed decisions that can mitigate risks, reduce casualties, and ensure effective resource allocation amidst uncertainties and dynamic conditions (Mladineo et al., 2011; Prelipcean & Boşcoianu, 2011; Önder & Uzun, 2022).

In addressing the unique challenges presented by crises, DSS utilize a structured framework that integrates real-time data, predictive analytics, and advanced modeling techniques. These components empower emergency planners, healthcare providers, and policymakers to navigate complex decision-making processes. For instance, the capacity of DSS to analyze large datasets allows for the optimization of medical supply distribution and personnel allocation, addressing logistical constraints and variations in demand (Szumilas et al., 2024; Önder & Uzun, 2022; Steen et al., 2017). Moreover, ensuring equitable access to resources, such as vaccines and hospital beds, necessitates sophisticated analytical models that balance efficiency with fairness (Önder & Uzun, 2022). The ability of DSS to process fragmented data and overcome interoperability barriers is critical for seamless coordination among different response entities (Wang et al., 2023).

Recent innovations in artificial intelligence (AI) and machine learning (ML), particularly their utilization within DSS frameworks, have further enhanced the effectiveness of emergency and public health management. AI-driven predictive models enable the forecasting of crises and assessment of risk levels, allowing for proactive resource deployment (Alves et al., 2024; Olorunsogo et al., 2024). Additionally, machine learning algorithms are transforming logistical planning and automating decision-making processes to improve response times during emergencies (Litvin et al., 2021; Zhou et al., 2018). The inclusion of Geographic Information Systems (GIS) enhances location-based decision-making, critical for monitoring and allocating resources effectively in affected areas (Önder & Uzun, 2022; Steen et al., 2017).

Technological advancements such as cloud computing and the Internet of Things (IoT) are also revolutionizing data collection and processing speeds, contributing to more accurate and timely decision-making capabilities within DSS (Wang, 2023; Sutton et al., 2020). By incorporating these advancements, modern decision-support frameworks are designed to bolster the resilience and responsiveness of public health and emergency management systems, which are increasingly vital in an era of complex global emergencies (Murphy et al., 2021; Smith et al., 2023). As the landscape of crisis management evolves, the importance of AI-enabled, data-centric DSS is expected to grow, ultimately playing a crucial role in safeguarding public health and optimizing the deployment of limited resources (Amândio et al., 2021; Malsia & Loku, 2024).

In summary, the integration of AI, ML, GIS, and other advanced technologies into DSS is transforming emergency response and public health management, offering a structured, data-driven approach to decision-making that enhances both efficiency and effectiveness during crises. This continuous evolution of decision-support frameworks will be pivotal in meeting the emerging challenges facing public health infrastructures and emergency responses in our increasingly complex world (Abiola-Adams, et al., 2025, Basiru, et al., 2023, Matthew, Nwaogelenya & Opia, 2024).

2.1. Methodology

This study employs the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to conduct a comprehensive review of decision-support frameworks for emergency response and public health resource allocation. The systematic review process involves identifying, screening, and selecting relevant literature to synthesize evidence-based decision-support models. A structured search strategy was developed to identify peer-reviewed journal articles, conference proceedings, and relevant reports. The search was conducted across multiple electronic databases, including PubMed, Scopus, Web of Science, IEEE Xplore, and Google Scholar. Keywords and Boolean operators were used to refine the search, incorporating terms such as "decision-support systems," "emergency response," "public health resource allocation," "AI-driven decision support," and "healthcare analytics." The inclusion criteria focused on studies published between 2018 and 2025 that discuss frameworks, methodologies, and applications of decision-support systems in emergency management and public health resource allocation.

The initial search yielded 4,512 records. After removing 1,207 duplicate records, 3,305 articles remained for title and abstract screening. Based on the predefined inclusion and exclusion criteria, 2,113 articles were excluded, leaving 1,192 full-text articles for further review. The full-text assessment led to the exclusion of 947 articles due to irrelevance, lack of methodological rigor, or insufficient empirical data. A total of 245 studies were included in the final synthesis. Data extraction was performed using a standardized data collection form to ensure consistency. The extracted data included study objectives, methodologies, types of decision-support frameworks, implementation approaches, effectiveness in emergency response, and applications in public health. A thematic synthesis approach was applied to analyze the findings, grouping them into categories such as AI-driven decision support, data-driven resource allocation, real-time decision-making frameworks, and integration of machine learning in emergency management.

To ensure reliability and minimize bias, two independent reviewers conducted the screening and data extraction processes. Discrepancies were resolved through discussions and, if necessary, consultation with a third reviewer. The PRISMA flow diagram shown in figure 1 visually represents the study selection process and the number of included and excluded studies at each stage. The findings of this systematic review provide valuable insights into the advancements in decision-support frameworks for emergency response and public health resource allocation. The results highlight the critical role of AI, machine learning, and data analytics in enhancing decision-making, optimizing resource distribution, and improving response efficiency in emergency scenarios.

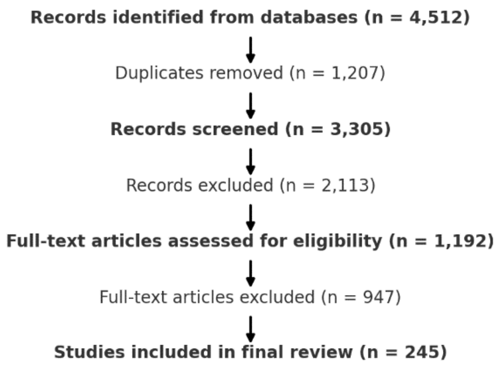

Figure 1: PRISMA Flow chart of the study methodology

2.2. Evolution of Decision-Support Systems for Emergency Response

Decision-support systems (DSS) have played a vital role in emergency response and public health resource allocation by providing structured frameworks for decision-making in crisis situations. Over the years, these systems have evolved from traditional approaches to modern, AI-driven, data-centric models that enhance predictive capabilities, optimize resource distribution, and improve real-time situational awareness (Agho, et al., 2022, Basiru, et al., 2023, Kelvin-Agwu, et al., 2024, Nwaogelenya & Opia, 2025). The evolution of DSS for emergency response has been shaped by technological advancements, the increasing complexity of emergencies, and the growing need for more effective resource management.

Traditional decision-support systems for emergency response were largely rule-based and relied on static databases, pre-determined protocols, and expert judgment. These systems were built using decision trees, simulation models, and basic statistical analysis to provide guidance during crises. While they were useful for structured decision-making, they had significant limitations in handling real-time data, adapting to rapidly changing conditions, and incorporating dynamic variables (Adewumi, et al., 2024, Basiru, et al., 2023, Matthew, et al., 2021, Nwaozomudoh, et al., 2024). One of the primary drawbacks of traditional DSS was their reliance on historical data and pre-established contingency plans, which often lacked the flexibility needed for unpredictable events such as emerging pandemics, large-scale natural disasters, or terrorist attacks. Additionally, many of these systems were siloed, operating within specific organizations or jurisdictions without interoperability, which hindered coordination and effective resource sharing among multiple agencies.

Another key limitation of traditional DSS was their dependency on human expertise for data interpretation and decision implementation. Decision-makers had to manually analyze data from multiple sources, often leading to delays in response times. Furthermore, the static nature of these systems made it difficult to adjust decisions based on evolving conditions in real-time

(Ajiga, et al., 2024, Basiru, et al., 2023, Majebi, Adelodun & Anyanwu, 2024). The lack of automation and predictive capabilities meant that emergency responders had to rely on past experiences rather than data-driven insights, making the process more reactive than proactive. Additionally, scalability was a challenge, as these systems struggled to handle large volumes of information, making them less effective in complex, high-impact emergencies.

The integration of artificial intelligence (AI) and big data into modern decision-support systems has revolutionized emergency response and public health resource allocation. AI-driven DSS leverage machine learning (ML), deep learning, and natural language processing (NLP) to analyze vast amounts of data, detect patterns, and provide real-time recommendations. These systems process structured and unstructured data from multiple sources, including sensors, social media, satellite imagery, and electronic health records, to generate insights that enhance decision-making (Ajayi & Akerele, 2021, Basiru, et al., 2023, Kelvin-Agwu, et al., 2024). Unlike traditional systems, AI-powered DSS continuously learn from new data, enabling them to adapt to evolving emergencies and improve their predictive accuracy over time.

Big data analytics has further enhanced the capabilities of modern DSS by enabling the processing of large datasets from diverse sources. In emergency response, big data allows for the integration of epidemiological data, weather reports, transportation networks, and social media trends to provide a comprehensive view of the situation. This multidimensional approach helps decision-makers assess risks, allocate resources efficiently, and coordinate response efforts across different agencies (Adepoju, et al., 2024, Basiru, et al., 2023, Majebi, Adelodun & Anyanwu, 2024). For instance, during the COVID-19 pandemic, AI-powered DSS analyzed real-time infection rates, hospital capacities, and mobility patterns to optimize healthcare resource distribution and predict potential outbreaks. Similarly, in disaster management, big data analytics has been used to assess damage, identify affected populations, and streamline evacuation plans based on real-time geospatial data. Figure 2 shows Resilience Framework for Public Health Emergency Preparedness presented by Khan, et al., 2018.

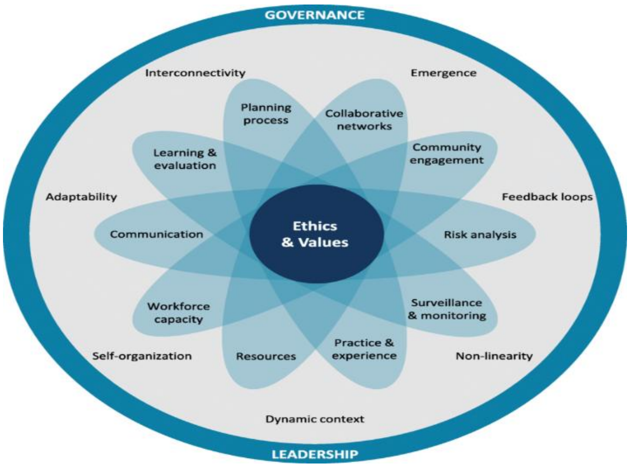

Figure 2: Resilience Framework for Public Health Emergency Preparedness (Khan, et al., 2018).

One of the key advantages of AI-driven DSS is their ability to automate decision-making processes, reducing the cognitive load on human responders and minimizing delays in critical situations. AI models can process large datasets within seconds, providing rapid insights that help emergency planners deploy medical supplies, first responders, and relief materials more effectively (Adelodun & Anyanwu, 2025, Basiru, et al., 2023, Matthew, et al., 2024). Additionally, natural language processing enables these systems to extract relevant information from unstructured data sources, such as social media posts, news reports, and emergency call logs, providing valuable situational awareness that traditional DSS lacked. AI also enhances decision-support frameworks by incorporating reinforcement learning, which allows models to optimize strategies based on real-time feedback, improving the efficiency of emergency response operations.

Predictive modeling and real-time analytics play a crucial role in modern decision-support systems by enabling proactive emergency management. Predictive models use historical and real-time data to forecast potential disasters, disease outbreaks, and resource shortages. These models employ machine learning algorithms, statistical inference, and geospatial analysis to identify trends, assess risks, and recommend preventive measures before a crisis escalates (Agbede, et al., 2023, Basiru, et al., 2023, Kelvin-Agwu, et al., 2024). For example, AI-driven epidemic modeling has been instrumental in predicting the spread of infectious diseases, allowing public health officials to implement targeted interventions and allocate medical resources efficiently.

Real-time analytics enhances emergency response by providing up-to-date information on evolving crises, enabling decision-makers to adjust strategies dynamically. Unlike traditional DSS, which relied on static datasets, real-time analytics integrates continuous data streams from IoT devices, satellite imagery, and emergency response networks to generate instant insights (Ajiga, et al., 2024, Basiru, et al., 2022, Majebi, Adelodun & Anyanwu, 2024). This capability is particularly critical in disaster management, where situational conditions change rapidly, requiring quick and informed decision-making. In flood response, for instance, real-time data from sensors and drones can provide accurate flood mapping, helping authorities coordinate rescue operations and infrastructure protection efforts. Public health emergency preparedness and response analysis framework presented by He, et al., 2020, is shown in figure 3.

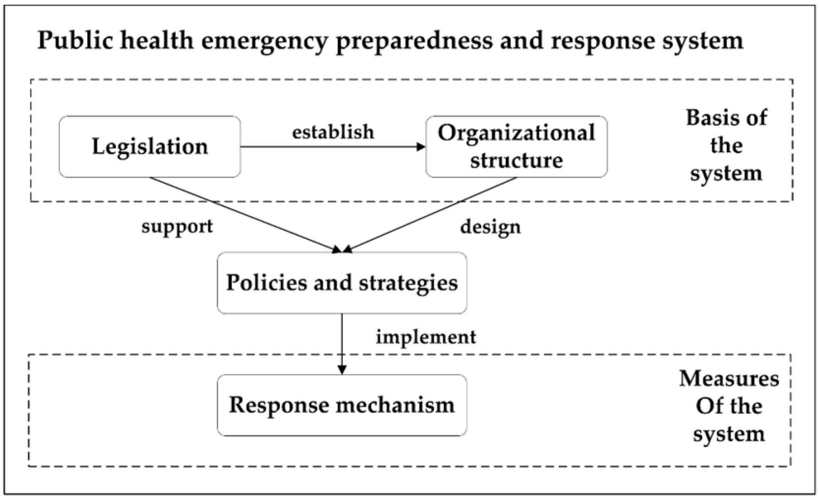

Figure 3: Public health emergency preparedness and response analysis framework (He, et al., 2020).

Furthermore, real-time analytics enables adaptive resource allocation, ensuring that emergency supplies, personnel, and medical equipment are deployed based on current needs rather than static pre-planned strategies. AI-powered dashboards visualize real-time data, allowing emergency managers to monitor key metrics, such as hospital occupancy rates, ambulance response times, and supply chain disruptions (Adenusi, et al., 2024, Bidemi, et al., 2021, Kelvin-Agwu, et al., 2024, Matthew, et al., 2021). These dashboards provide interactive decision-making tools that enhance coordination among various stakeholders, including government agencies, healthcare providers, and humanitarian organizations.

The integration of AI, big data, and predictive modeling has also improved crisis communication and public engagement. AI-driven DSS can disseminate targeted alerts and emergency notifications based on location-specific risks, ensuring that communities receive relevant and timely information. Sentiment analysis of social media data helps authorities gauge public perception, identify misinformation, and address concerns proactively. Additionally, chatbots and virtual assistants powered by AI provide real-time guidance to individuals seeking emergency assistance, reducing the burden on helplines and first responders (Agho, et al., 2023, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2024, Majebi, et al., 2023).

Despite the significant advancements in modern DSS, challenges remain in their implementation and scalability. Data privacy and security concerns must be addressed to ensure that sensitive information is protected from cyber threats. Algorithmic bias is another critical issue, as AI models may inadvertently reflect disparities present in training data, leading to unequal resource allocation. Ensuring transparency and accountability in AI-driven decision-making is essential to build trust among stakeholders and communities affected by emergency responses (Adelodun & Anyanwu, 2024, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2023, Majebi, Adelodun & Anyanwu, 2024).

Future advancements in decision-support frameworks should focus on enhancing explainable AI (XAI) to improve the interpretability of AI-driven recommendations. By making AI models more transparent, decision-makers can better understand the rationale behind automated suggestions and ensure that ethical considerations are incorporated into emergency response strategies. Additionally, integrating blockchain technology can enhance the security and reliability of data-sharing mechanisms, enabling seamless collaboration among multiple agencies while ensuring data integrity (Adelodun, et al., 2018, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2024, Koroma, et al., 2024). Boyd, et al., 2014, presented Conceptual model of health emergency planning as shown in figure 4.

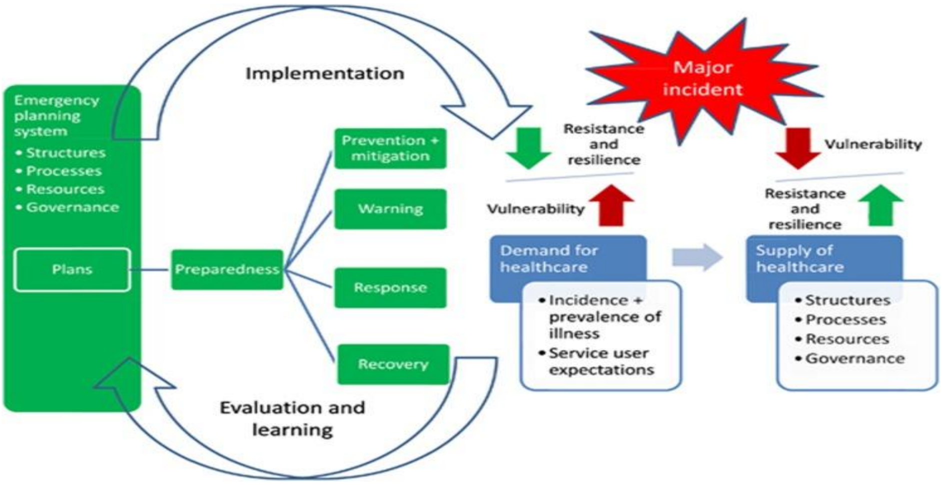

Figure 4: Conceptual model of health emergency planning (Boyd, et al., 2014).

The evolution of decision-support systems for emergency response and public health resource allocation reflects the growing need for more efficient, data-driven, and adaptive crisis management approaches. While traditional DSS provided structured decision-making frameworks, they were limited by their reliance on static data, manual interpretation, and lack of real-time adaptability (Adewoyin, 2022, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2023, Kelvin-Agwu, et al., 2024). The integration of AI, big data, and predictive modeling has transformed these systems into powerful tools capable of real-time analysis, automation, and dynamic resource optimization. By leveraging these technological advancements, emergency response agencies and public health officials can enhance preparedness, improve response efficiency, and ultimately save lives during crises. Continued research and innovation in AI-driven DSS will be crucial in addressing emerging challenges and ensuring that emergency response systems remain resilient in the face of evolving threats.

2.3. Key Technologies in Decision-Support Frameworks

The integration of advanced technologies in decision-support frameworks has dramatically enhanced emergency response and public health resource allocation. The ability to make timely, data-driven decisions in high-pressure environments is increasingly essential in managing crises such as pandemics, natural disasters, and public health emergencies (Adewumi, et al., 2024, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2022, Kokogho, et al., 2024). Among the key technologies transforming decision-support systems (DSS) are artificial intelligence (AI), machine learning (ML), geospatial information systems (GIS), remote sensing, the Internet of Things (IoT), cloud computing, and hybrid modeling approaches. These technologies enable more accurate forecasting, optimized resource allocation, real-time situational awareness, and improved decision-making capabilities during crises.

Artificial intelligence and machine learning have become central to modern DSS by enabling predictive analytics and data-driven decision-making. In emergency response and public health, predictive analytics plays a crucial role in forecasting potential crises and identifying emerging risks. For instance, AI models can analyze vast amounts of historical data, including weather patterns, social behavior, and health records, to predict the likelihood of an outbreak or disaster (Ajayi & Akerele, 2022, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2024, Kokogho, et al., 2025). By leveraging machine learning algorithms, these systems can continuously improve their predictions, enhancing the accuracy of crisis forecasting. This allows emergency responders to take proactive measures, such as pre-positioning resources or mobilizing healthcare staff, to address the expected demands.

In addition to crisis forecasting, AI-driven optimization techniques are instrumental in resource allocation. During a crisis, resources such as medical supplies, personnel, and healthcare infrastructure are limited, requiring efficient and fair distribution. AI models can optimize resource allocation by analyzing real-time data and providing recommendations for the deployment of resources. For example, machine learning algorithms can evaluate data from multiple sources, such as hospital capacity, patient needs, and supply chains, to dynamically allocate resources where they are most needed (Ajiga, et al., 2024, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2022, Kokogho, et al., 2024). By continuously adjusting to changing conditions, AI-driven optimization helps prevent shortages and ensures that critical resources are used effectively.

Geospatial information systems (GIS) and remote sensing technologies have become invaluable tools for location-based decision-making in emergency planning. GIS enables the visualization and analysis of spatial data, which is essential for understanding the geographic distribution of a crisis, such as a disease outbreak or a natural disaster. By integrating GIS with real-time data from remote sensing technologies, such as satellites and drones, decision-makers can monitor affected areas, assess damage, and identify vulnerable populations (Adekola, et al., 2023, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2024, Kokogho, et al., 2024). GIS tools help responders prioritize actions by providing clear, actionable insights about where resources should be deployed. For example, in a flood situation, GIS can identify areas most at risk, enabling authorities to direct evacuation efforts or deliver aid to high-priority locations.

Remote sensing, often combined with GIS, enhances situational awareness by providing real-time data about affected regions. This technology can capture information on land conditions, infrastructure damage, and environmental hazards, which is essential for disaster response. During events like wildfires, hurricanes, or earthquakes, remote sensing can provide continuous monitoring, ensuring that decision-makers have up-to-date information for assessing the extent of the disaster (Adelodun & Anyanwu, 2024, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2022, Kokogho, et al., 2023). Furthermore, remote sensing aids in tracking the movement of diseases, such as monitoring the spread of vector-borne diseases using environmental data, which informs public health responses and interventions.

The Internet of Things (IoT) and cloud computing are two complementary technologies that have revolutionized real-time data collection and processing for rapid response in emergencies. IoT devices, such as sensors, wearables, and medical equipment, generate large volumes of real-time data that provide valuable insights into the status of both patients and emergency situations. For example, in a healthcare setting, IoT-enabled devices can monitor patient vital signs, track the availability of medical equipment, or provide updates on the status of emergency facilities (Agho, et al., 2023, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2022, Kelvin-Agwu, et al., 2024). This data is crucial for emergency responders and healthcare workers, as it helps them make informed decisions about the distribution of resources and the management of patient care.

Cloud computing plays a central role in processing and storing the massive amounts of data generated by IoT devices. It allows for scalable, distributed computing, ensuring that data from numerous sources can be analyzed and shared in real-time. In crisis situations, cloud platforms enable healthcare providers, emergency responders, and governmental agencies to access and analyze data quickly, regardless of their location (Abiola, Okeke & Ajani, 2024, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2024). This accessibility ensures that decision-makers can coordinate efforts across different regions, improving collaboration during crises. Moreover, cloud computing facilitates data storage and management, making it easier to retrieve and analyze historical data to improve future crisis response strategies.

Hybrid modeling approaches that combine agent-based models, reinforcement learning, and Bayesian inference represent a cutting-edge development in DSS for emergency response and public health resource allocation. Agent-based models (ABMs) simulate the interactions of individual agents within a system, which can be useful for understanding how specific behaviors or interventions influence the overall outcome in a crisis (Abiola-Adams, et al., 2023, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2023). For example, ABMs can simulate the spread of infectious diseases within a population, taking into account factors such as individual behaviors, contact networks, and healthcare interventions. This modeling approach helps decision-makers explore the potential impacts of different strategies, such as social distancing, vaccination campaigns, or quarantine measures, before implementing them in real-world scenarios.

Reinforcement learning (RL), a subfield of machine learning, is used to optimize decision-making in dynamic environments. RL algorithms learn by interacting with their environment and receiving feedback in the form of rewards or penalties. In the context of emergency response, RL can be applied to optimize resource allocation strategies based on real-time feedback (Adewumi, et al., 2024, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2022, Nwaozomudoh, et al., 2024). For instance, RL can be used to improve the allocation of hospital beds, ventilators, and medical staff during a pandemic, continuously adjusting as new data becomes available. By leveraging RL, decision-makers can identify the most effective strategies for responding to evolving crises.

Bayesian inference, another key component of hybrid modeling approaches, is a probabilistic method that allows for the incorporation of uncertainty into decision-making. During emergencies, data is often incomplete or uncertain, making it challenging to make precise predictions. Bayesian inference enables decision-makers to update their beliefs about the situation as new information is received (Adenusi, et al., 2024, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2024, Kelvin-Agwu, et al., 2024). This approach is particularly useful in the context of public health, where uncertainties around disease transmission, treatment effectiveness, and healthcare capacity can influence resource allocation. By combining Bayesian methods with agent-based models and reinforcement learning, decision-support frameworks can provide more robust and adaptable solutions to crisis management.

These key technologies—AI, machine learning, GIS, IoT, cloud computing, and hybrid modeling—collectively enhance the effectiveness of decision-support systems in emergency response and public health resource allocation. They enable more accurate predictions, optimize resource deployment, and improve situational awareness in real-time. The integration of these technologies into decision-support frameworks allows for faster, more efficient, and more data-driven decision-making during crises, ultimately improving outcomes and saving lives (Adelodun & Anyanwu, 2024, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2023, Iwe, et al., 2023). As technology continues to advance, these systems will only become more powerful, offering increasingly sophisticated tools to address the complex challenges of global health emergencies and disaster response.

2.4. Applications of Advanced DSS in Emergency and Public Health Response

In recent years, the integration of advanced decision-support systems (DSS) has significantly transformed emergency and public health response efforts, particularly during large-scale crises such as pandemics and natural disasters. These advanced frameworks leverage cutting-edge technologies, such as artificial intelligence (AI), machine learning (ML), and data analytics, to optimize decision-making and resource allocation. By providing real-time insights and predictive capabilities, these systems enhance preparedness, response times, and overall effectiveness in managing emergencies (Ajayi & Akerele, 2022, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2024, Ikwuanusi, et al., 2022). This essay explores the various applications of advanced DSS in the context of pandemic response, natural disaster management, and hospital surge capacity management, highlighting their transformative impact on public health and emergency management systems.

During a pandemic, the ability to respond swiftly and effectively is crucial to controlling the spread of disease and mitigating its impact on communities. AI-driven tools have proven to be instrumental in pandemic response, particularly in areas such as contact tracing and outbreak prediction. Traditional contact tracing methods, which rely on manual efforts to trace and notify individuals who may have been exposed to a contagious person, are often time-consuming and prone to errors (Ajiga, et al., 2024, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2022, Ibeh, et al., 2025). However, AI-powered systems can process vast amounts of data from various sources, such as mobile phone locations, healthcare databases, and social media, to rapidly identify potential contacts of infected individuals. These systems are capable of continuously updating contact tracing efforts as new data becomes available, thus ensuring a faster and more accurate response.

In addition to contact tracing, advanced DSS have been instrumental in outbreak prediction, enabling health authorities to predict the trajectory of an epidemic or pandemic. Machine learning algorithms can analyze historical health data, patterns of transmission, and socio-economic factors to forecast future outbreaks, identify hotspots, and anticipate healthcare resource needs (Adegoke, et al., 2022, Bristol-Alagbariya, Ayanponle & Ogedengbe, 2023, Gbadegesin, et al., 2022). These predictive models can inform early warning systems, allowing governments and health organizations to take proactive measures such as issuing quarantines, distributing medical resources, or preparing healthcare facilities. By leveraging AI and big data, these systems can provide a more accurate and timely response to emerging health threats, potentially preventing widespread outbreaks and saving lives.

Optimizing vaccine distribution and hospital capacity management is another critical area where advanced DSS have demonstrated their value during pandemics. The distribution of vaccines, particularly in the early stages of a pandemic, requires careful planning to ensure equitable access and maximize the effectiveness of immunization campaigns. Advanced DSS can help optimize vaccine distribution by taking into account factors such as population density, mobility patterns, and disease prevalence in different regions (Agho, et al., 2021, Chigboh, Zouo & Olamijuwon, 2024, Eyo-Udo, et al., 2025). By analyzing these variables, these systems can identify priority areas for vaccine distribution, ensuring that those at highest risk receive the vaccine first. Moreover, DSS can assist in managing the logistics of vaccine storage, transportation, and administration, ensuring that vaccines are delivered efficiently and safely.

Hospital capacity management is another vital aspect of pandemic response, particularly when hospitals are overwhelmed with patients. Advanced DSS can help predict hospital surge capacity needs, including the availability of ICU beds, ventilators, and medical supplies. Using real-time data, AI-driven tools can assess current hospital occupancy rates, track patient outcomes, and predict future demand for critical care resources (Adelodun & Anyanwu, 2024, Chigboh, Zouo & Olamijuwon, 2024, Eyo-Udo, et al., 2025). This allows healthcare systems to proactively allocate resources, move patients between facilities, and make informed decisions about when to open temporary care centers. Moreover, these tools can help ensure that critical supplies, such as personal protective equipment (PPE), are available where they are needed most, thereby preventing shortages and ensuring the safety of both patients and healthcare workers.

Natural disasters, such as hurricanes, earthquakes, and wildfires, present unique challenges in terms of emergency response and resource allocation. Advanced DSS are particularly effective in real-time disaster forecasting and resource mobilization. AI-driven forecasting systems can analyze weather patterns, seismic activity, and other environmental factors to predict the likelihood and severity of natural disasters (Ajiga, et al., 2024, Chintoh, et al., 2024, Eyo-Udo, et al., 2024, Neupane, et al., 2024). These systems can provide early warnings to affected populations, allowing them to evacuate or take other protective measures in advance of the disaster. Moreover, real-time data analytics can support the identification of areas most at risk, enabling responders to prioritize resources and personnel in those regions.

In the aftermath of a disaster, advanced DSS are crucial for effective resource mobilization. These systems can integrate data from multiple sources, such as satellite imagery, social media, and ground-level reports, to assess the scale of damage and identify areas where assistance is most needed. This information can then be used to optimize the allocation of resources, including food, water, medical supplies, and personnel. Advanced DSS can also assist in coordinating the logistics of resource distribution, ensuring that aid reaches affected populations quickly and efficiently (Adewumi, et al., 2024, Chintoh, et al., 2024, Eyo-Udo, et al., 2024). By improving situational awareness and enhancing decision-making during disaster response, these systems help minimize the impact of natural disasters on vulnerable communities.

Hospital surge capacity management is another critical area where advanced DSS are playing an increasingly important role. In the event of a large-scale emergency, such as a pandemic or natural disaster, hospitals may face overwhelming numbers of patients, particularly those requiring critical care. The ability to manage surge capacity effectively is essential to ensuring that healthcare facilities can provide adequate care to all patients, especially those in need of intensive treatment (Abiola-Adams, et al., 2025, Chintoh, et al., 2025, Eyo-Udo, et al., 2025). AI-driven tools are being used to optimize the allocation of ICU beds, ventilators, and other medical supplies, based on real-time data and predictive models.

These tools can monitor patient flow within hospitals, track the availability of critical care resources, and predict future demand based on trends in patient admissions. For example, if a hospital anticipates a surge in COVID-19 cases, the system can suggest adjustments to staffing levels, reallocate resources, or even transfer patients to other facilities with available capacity (Adekoya, et al., 2024, Chintoh, et al., 2024, Eyo-Udo, et al., 2025). Furthermore, these systems can help prioritize care for the most critically ill patients, ensuring that those who need immediate attention receive it first. In addition to managing hospital capacity, DSS can also optimize the distribution of essential medical supplies, such as ventilators and medications, ensuring that these resources are allocated where they are most needed.

The integration of AI and data analytics in healthcare systems has transformed not only emergency response but also the broader field of healthcare management. The insights provided by these advanced DSS enable healthcare providers to make data-driven decisions, allocate resources more effectively, and improve patient outcomes. Additionally, by streamlining workflows and automating certain processes, these systems reduce the administrative burden on healthcare workers, allowing them to focus on providing care to patients (Adewumi, et al., 2024, Chintoh, et al., 2024, Eyo-Udo, et al., 2025, Nwaozomudoh, et al., 2024).

The importance of these advanced DSS in emergency response and public health cannot be overstated. Their ability to provide real-time insights, predict future needs, and optimize resource allocation is vital for effectively managing complex emergencies, whether they are pandemics, natural disasters, or large-scale surges in hospital demand. By enhancing decision-making capabilities and improving operational efficiency, these frameworks are helping save lives, reduce suffering, and build more resilient healthcare and emergency management systems (Adewoyin, et al., 2025, Chintoh, et al., 2025, Ewim, et al., 2025, Nwaimo, et al., 2023). As technology continues to evolve, the potential applications of advanced DSS will only expand, further strengthening our ability to respond to the challenges of the future.

2.5. Challenges in Implementing Advanced DSS

The implementation of advanced decision-support systems (DSS) for emergency response and public health resource allocation has the potential to revolutionize crisis management and optimize the distribution of vital resources. These frameworks integrate artificial intelligence, big data analytics, and machine learning models to enhance decision-making during emergencies (Adelodun & Anyanwu, 2024, Chintoh, et al., 2024, Ewim, et al., 2024). However, significant challenges hinder their effective deployment, ranging from concerns over data privacy and security to issues of fairness in resource allocation and the technical difficulties of integrating DSS into existing infrastructures.

One of the most pressing challenges in implementing advanced DSS is data privacy, security, and ethical concerns. These systems rely on vast amounts of personal health data, emergency response records, and real-time surveillance information, raising serious privacy implications. The collection and processing of such sensitive information require stringent data protection measures to prevent unauthorized access and misuse (Agho, et al., 2024, Dienagha, et al., 2021, Ewim, et al., 2025, Mbakop, et al., 2024). With cyber threats becoming increasingly sophisticated, there is a heightened risk of data breaches that could compromise individuals' private information and undermine public trust in DSS applications. Ensuring compliance with stringent data protection laws, such as the General Data Protection Regulation (GDPR) in Europe or the Health Insurance Portability and Accountability Act (HIPAA) in the United States, adds another layer of complexity. Ethical concerns also arise regarding informed consent, as individuals may not always be aware of how their data is being collected, processed, and utilized in decision-making. The trade-off between using comprehensive data for effective crisis management and preserving individuals' privacy remains a critical point of contention.

Beyond privacy concerns, ensuring fairness in resource distribution is another major challenge. Advanced DSS often leverage algorithmic models to determine how emergency resources, such as ventilators, hospital beds, vaccines, and personnel, should be allocated. However, these models can inherit and even exacerbate existing biases in historical data. If the training data reflect historical disparities in healthcare access, the DSS may inadvertently reinforce inequities rather than mitigate them (Adewumi, et al., 2024, Drakeford & Majebi, 2024, Ewim, et al., 2024). For example, algorithms trained on past hospital admissions might prioritize resource allocation to regions with higher historical admission rates, which could disadvantage underserved or marginalized communities that have historically faced barriers to healthcare access. Algorithmic bias can result in disproportionate outcomes that worsen social and racial disparities, leading to public distrust in DSS-driven decision-making.

Ensuring fairness in emergency resource distribution requires proactive strategies, such as algorithmic audits, fairness-aware machine learning models, and stakeholder engagement to identify and rectify biases. Additionally, transparency in decision-making is crucial. Public health officials and emergency responders must be able to interpret the rationale behind DSS-generated recommendations to justify decisions and build public confidence (Ajayi, et al., 2025, Digitemie, et al., 2025, Ewim, et al., 2025, Nwaimo, Adewumi & Ajiga, 2022). This necessity calls for the development of explainable AI models that provide insights into how decisions are made, rather than relying on opaque, black-box systems that may lead to skepticism and resistance from both policymakers and the public.

The challenge of scalability and integration with existing healthcare and emergency infrastructures further complicates the deployment of advanced DSS. Healthcare systems and emergency response networks are often built on legacy architectures that were not designed to accommodate real-time data-driven decision-making. Integrating sophisticated DSS frameworks into these outdated infrastructures requires substantial financial investment, technical expertise, and institutional commitment (Ajiga, et al., 2024, Drakeford & Majebi, 2024, Ewim, et al., 2024). In many cases, healthcare facilities and emergency response agencies operate with disparate data systems that do not communicate effectively with one another, creating interoperability issues. Without seamless integration, DSS applications may struggle to access the real-time, comprehensive data required for optimal decision-making, limiting their effectiveness in emergency scenarios.

Scalability presents an additional hurdle, as DSS solutions must be capable of handling vast amounts of data from multiple sources while maintaining responsiveness during large-scale crises. Natural disasters, pandemics, and mass casualty events generate high volumes of data at an unprecedented rate, requiring DSS frameworks to scale efficiently without performance degradation (Abiola, Okeke & Ajani, 2024, Drakeford & Majebi, 2024, Ewim, et al., 2025). Many current systems are not designed to accommodate the demands of large-scale crisis management, necessitating substantial upgrades in computational capacity, cloud infrastructure, and distributed computing capabilities. Developing scalable DSS frameworks also entails ensuring that they remain adaptable to different crisis scenarios, from infectious disease outbreaks to climate-related disasters, without requiring extensive modifications.

Moreover, real-world implementation challenges extend beyond technological factors to include resistance from stakeholders. Emergency response personnel and healthcare administrators may be hesitant to adopt DSS-driven approaches due to concerns about reliability, usability, and loss of human oversight in decision-making. The perception that automated systems may override expert judgment can lead to reluctance in trusting these technologies, particularly in high-stakes environments where human experience and intuition are critical (Aderinwale, et al., 2024, Drakeford & Majebi, 2024, Elugbaju, Okeke & Alabi, 2024). Addressing this resistance requires comprehensive training programs to familiarize users with DSS functionalities and demonstrate their ability to augment—rather than replace—human decision-making.

Financial constraints also pose a barrier to widespread adoption. The development and deployment of advanced DSS require significant investment in infrastructure, software development, data storage, and cybersecurity measures. Many public health agencies, particularly in low- and middle-income countries, may lack the resources to implement and sustain these systems at scale (Abiola-Adams, et al., 2023, Drakeford & Majebi, 2024, Elugbaju, Okeke & Alabi, 2024). Funding limitations can result in the unequal adoption of DSS, where well-resourced institutions benefit from advanced capabilities while underfunded regions continue to rely on traditional, less efficient methods. This disparity can exacerbate existing inequalities in public health and emergency response capacities, leading to an uneven distribution of benefits.

In addition to financial constraints, legal and regulatory barriers present another obstacle. DSS frameworks must comply with varying national and international regulations governing data privacy, emergency management protocols, and healthcare standards. The lack of standardized guidelines for DSS implementation complicates the process of developing universally applicable systems (Adelodun & Anyanwu, 2024, Edoh, 2021, Elugbaju, Okeke & Alabi, 2024). Countries and regions with differing regulatory environments may face challenges in aligning their DSS frameworks with existing laws, leading to delays in adoption and deployment. Establishing standardized policies that outline ethical, legal, and technical requirements for DSS integration is essential to ensuring consistency and interoperability across different jurisdictions.

Another key challenge is the need for real-time, high-quality data to ensure accurate and timely decision-making. DSS models rely on continuous data inputs from various sources, including hospitals, emergency response units, wearable health devices, and social media platforms. However, data collection in real-time emergency scenarios is often fragmented, incomplete, or delayed. Inaccurate or outdated data can lead to suboptimal decision-making, reducing the overall effectiveness of DSS recommendations (Adewumi, et al., 2024, Edoh, et al., 2024, Elufioye, et al., 2024, Nnagha, et al., 2023). Ensuring data quality requires robust validation mechanisms, improved real-time data transmission technologies, and enhanced collaboration between data providers.

Addressing these challenges requires a multi-faceted approach that balances technological innovation with ethical, regulatory, and infrastructural considerations. Strategies to enhance DSS implementation include investing in secure data-sharing frameworks that protect privacy while enabling data-driven insights, developing bias-aware algorithms that promote equitable resource distribution, and fostering interoperability between DSS and existing emergency response infrastructures (Adekoya, et al., 2024, Edoh, et al., 2024, Ekeh, et al., 2025, Mbakop, et al., 2024). Moreover, adopting user-friendly interfaces and training programs can improve stakeholder confidence and encourage wider adoption. Public-private partnerships can also play a crucial role in bridging financial gaps and promoting collaborative efforts to scale DSS solutions for global public health challenges.

Despite the challenges, the potential benefits of advanced DSS in emergency response and public health resource allocation remain substantial. These systems have the capacity to enhance situational awareness, optimize resource allocation, and improve crisis response outcomes when implemented effectively. By addressing key barriers such as data privacy concerns, algorithmic fairness, and scalability limitations, decision-support frameworks can evolve into indispensable tools for mitigating the impact of emergencies and safeguarding public health on a global scale (Adekoya, et al., 2024, Edoh, et al., 2024, Ekeh, et al., 2025, Mbakop, et al., 2024). However, success will depend on proactive efforts to refine these systems, ensuring they are not only technologically sophisticated but also ethically sound, equitably distributed, and seamlessly integrated into existing infrastructures.

2.6. Future Directions and Recommendations

Advances in decision-support frameworks for emergency response and public health resource allocation are continuously evolving, driven by the need for improved efficiency, accuracy, and equity in crisis management. The increasing complexity of public health emergencies, coupled with the demand for rapid and effective decision-making, necessitates innovative solutions that can enhance transparency, security, and governance in AI-driven decision-support systems (DSS) (Abiola-Adams, et al., 2025, Edoh, et al., 2024, Ekeh, et al., 2025, Nwaozomudoh, 2024). Future directions in this field emphasize the integration of explainable AI (XAI) to improve decision transparency, blockchain technology for secure and decentralized emergency data management, and comprehensive policy and governance frameworks that ensure ethical and effective implementation of AI in public health and disaster response.

The integration of explainable AI (XAI) into decision-support systems is a critical step toward enhancing transparency in decision-making. Traditional AI models, particularly deep learning and complex machine learning algorithms, often function as "black boxes," making it difficult for stakeholders to interpret how decisions are reached. In emergency response and public health resource allocation, this lack of transparency can lead to mistrust among healthcare professionals, emergency responders, policymakers, and the general public (Adewumi, Ochuba & Olutimehin, 2024, Ekeh, et al., 2025, Matthew, et al., 2024). By implementing XAI, decision-makers can understand the rationale behind AI-driven recommendations, ensuring that critical resource allocation decisions—such as distributing ventilators during a pandemic or deploying emergency personnel during a disaster—are based on clear and interpretable insights. XAI not only enhances trust in AI systems but also facilitates the identification of biases in algorithms, allowing for corrective measures to be taken in real-time. This is particularly important in ensuring that resource distribution is fair, data-driven, and aligned with ethical considerations.

The application of blockchain technology in emergency data management offers a promising solution to the challenges of data security, decentralization, and interoperability. Traditional centralized data systems are vulnerable to cyberattacks, data breaches, and unauthorized alterations, which can compromise the integrity of emergency response operations. Blockchain technology, with its decentralized and immutable ledger, ensures that critical emergency response data—such as real-time patient records, resource inventories, and incident reports—remain secure and tamper-proof (Adewoyin, 2021, Edoh, et al., 2016, Ekeh, et al., 2025, Matthew, Opia & Matthew, 2023). By leveraging blockchain, emergency response agencies and public health organizations can enhance collaboration by providing a transparent and trustworthy data-sharing platform. This is particularly relevant in scenarios where multiple agencies, including government bodies, non-governmental organizations, and private entities, need to coordinate their efforts seamlessly. Furthermore, blockchain facilitates faster and more efficient verification of information, reducing administrative delays in resource deployment and ensuring that vital resources reach affected populations without unnecessary bureaucratic hurdles. Additionally, smart contracts can automate various aspects of emergency response, such as triggering the release of medical supplies based on predefined conditions, thereby improving efficiency in crisis management.

The successful implementation of AI-driven decision-support frameworks in public health and disaster response requires robust policy and governance frameworks to address ethical, legal, and operational challenges. Without clear guidelines and regulatory oversight, AI-driven DSS may lead to unintended consequences, including biased decision-making, privacy violations, and operational inefficiencies. A well-structured governance framework ensures that AI applications in emergency response and public health adhere to ethical principles, such as fairness, accountability, and transparency (Ajiga, et al., 2024, Edoh, Ukpabi & Igol, 2021, Egbuhuzor, et al., 2025). One critical aspect of governance is the establishment of standards for data collection, storage, and usage. Since AI-driven DSS rely heavily on vast amounts of data, including sensitive health records and geospatial information, policymakers must implement stringent data privacy laws to protect individuals' rights. Clear guidelines on data ownership, consent mechanisms, and anonymization techniques must be established to balance the need for data-driven insights with privacy considerations.

Another key component of governance is the creation of interdisciplinary oversight committees that bring together experts from healthcare, emergency management, technology, ethics, and law. These committees can evaluate AI models for fairness, accuracy, and reliability before they are deployed in real-world scenarios. In addition, ongoing monitoring mechanisms should be implemented to assess AI performance and mitigate potential biases that may arise over time (Adelodun & Anyanwu, 2024, Edoh, Ukpabi & Igol, 2021, Efobi, et al., 2025). Transparent audit trails must be established to allow stakeholders to review AI-driven decisions and challenge any inconsistencies or ethical concerns. To enhance public trust in AI-driven DSS, governments and organizations must prioritize public engagement and education initiatives. Many individuals and communities may be skeptical of AI-based decision-making, particularly in high-stakes situations such as emergency evacuations or vaccine distribution. Public awareness campaigns that explain the benefits, limitations, and safeguards of AI-driven DSS can help build confidence and encourage greater acceptance of these technologies.

Furthermore, international collaboration is essential for developing standardized frameworks that enable seamless data sharing and coordination across borders. Public health emergencies and natural disasters often extend beyond national boundaries, requiring a coordinated response from multiple countries and organizations. By establishing global AI governance standards, policymakers can facilitate interoperability between different DSS platforms, allowing for more effective and timely responses to crises (Adewumi, et al., 2023, Edoh, et al., 2018, Efobi, et al., 2023, Nwaogelenya & Opia, 2025). Funding and resource allocation for AI-driven DSS should be a priority for governments and international organizations. Investments in research and development, capacity-building programs, and digital infrastructure are necessary to enhance the capabilities of decision-support systems. Governments should also incentivize public-private partnerships that bring together AI developers, healthcare providers, emergency response agencies, and academia to drive innovation in this field.

In addition to governance frameworks, ethical considerations must be integrated into the development and deployment of AI-driven DSS. AI models should be designed with inclusivity in mind, ensuring that they do not disproportionately disadvantage marginalized or vulnerable populations (Adewumi, et al., 2023, Edoh, et al., 2018, Efobi, et al., 2023, Nwaogelenya & Opia, 2025). This includes conducting rigorous fairness assessments and implementing corrective measures to address any detected biases in algorithmic decision-making. Ethical AI principles should be embedded in every stage of the AI lifecycle, from data collection and model training to deployment and evaluation. Explainability and interpretability should be prioritized to ensure that AI-driven decisions can be scrutinized and justified by human experts.

Training and capacity-building programs for emergency responders and public health professionals are also essential for the successful adoption of AI-driven DSS. Many emergency response personnel may not have prior experience with AI technologies, and equipping them with the necessary skills to interpret and utilize AI-generated insights is crucial. Training programs should focus on how to integrate AI-driven recommendations with human expertise, fostering a collaborative decision-making environment where AI complements rather than replaces human judgment. AI literacy initiatives should also be extended to policymakers and government officials to ensure that regulatory decisions are informed by a thorough understanding of AI capabilities and limitations.

Another critical area for future development is the integration of AI-driven DSS with real-time data sources, such as satellite imagery, IoT sensors, and wearable health devices. The ability to incorporate real-time data into decision-support frameworks enhances situational awareness, enabling faster and more accurate response strategies (Adewumi, et al., 2023, Edoh, et al., 2018, Efobi, et al., 2023, Nwaogelenya & Opia, 2025). For instance, AI-driven models can analyze satellite images of disaster-stricken areas to assess the extent of damage and prioritize rescue operations. Similarly, wearable health devices can provide real-time physiological data on individuals, allowing for early detection of health emergencies and timely medical interventions. By harnessing real-time data streams, AI-driven DSS can significantly improve the effectiveness of emergency response and public health resource allocation.

Advancements in simulation modeling and predictive analytics will also play a crucial role in enhancing AI-driven DSS. By developing sophisticated simulation models that account for various disaster scenarios and public health crises, decision-makers can test different response strategies in virtual environments before implementing them in real-world situations. These simulations allow for proactive planning, risk assessment, and capacity-building exercises that prepare emergency response agencies for future crises. Predictive analytics, powered by AI, can identify emerging threats and provide early warnings, allowing governments and organizations to take preemptive actions to mitigate potential risks.

In conclusion, the future of decision-support frameworks for emergency response and public health resource allocation lies in the integration of explainable AI for transparency, blockchain for secure data management, and robust policy and governance frameworks for ethical AI implementation (Adewumi, et al., 2023, Edoh, et al., 2018, Efobi, et al., 2023, Nwaogelenya & Opia, 2025). By addressing the challenges associated with AI-driven DSS, including transparency, security, bias, and scalability, stakeholders can enhance the effectiveness of emergency response operations and improve public health outcomes. Strategic investments in technology, capacity-building, and governance will be essential to ensure that AI-driven decision-support systems serve as reliable, ethical, and impactful tools in crisis management.

2.7. Conclusion

Advances in decision-support frameworks for emergency response and public health resource allocation have significantly enhanced the ability to make informed, data-driven decisions in crisis situations. These frameworks integrate artificial intelligence, data analytics, and predictive modeling to optimize resource allocation, improve situational awareness, and enhance response effectiveness. Key findings indicate that while AI-driven decision-support systems (DSS) offer immense potential, they also present challenges related to transparency, security, scalability, and fairness. The importance of explainable AI (XAI) in ensuring transparency and interpretability in decision-making cannot be overstated, as it fosters trust among stakeholders and ensures ethical deployment of AI in public health and disaster response. Similarly, blockchain technology has emerged as a powerful tool for enhancing the security and decentralization of emergency data management, providing tamper-proof data sharing that can improve collaboration and accountability across multiple agencies. Effective policy and governance frameworks are necessary to regulate AI-driven DSS, ensuring that these systems align with ethical standards, promote fairness in resource distribution, and protect sensitive data while maintaining efficiency in emergency response operations.

Interdisciplinary collaboration is essential for advancing decision-support systems in emergency and public health management. The integration of expertise from diverse fields, including computer science, medicine, public health, emergency management, data science, and ethics, creates a comprehensive approach to addressing challenges in DSS development and implementation. AI developers must work closely with emergency responders and healthcare professionals to ensure that decision-support tools are both technologically robust and practically relevant. Ethical oversight by policymakers and legal experts helps to establish regulatory frameworks that balance technological innovation with societal well-being. In addition, public engagement and education play a crucial role in ensuring that AI-driven DSS are widely accepted and effectively utilized. Stakeholders at all levels must be involved in discussions on data privacy, bias mitigation, and the role of automation in crisis decision-making. International collaboration is also vital, as public health emergencies and natural disasters often require coordinated responses that transcend national boundaries. Standardized governance structures, global data-sharing protocols, and joint research initiatives can help harmonize DSS development and ensure their effectiveness across different regions and crisis scenarios.

Emerging technologies continue to shape the future of emergency response and public health resource allocation, with AI, blockchain, and real-time data analytics playing a transformative role in optimizing decision-making processes. The integration of IoT devices, satellite imagery, and wearable health sensors enables real-time monitoring of crises, providing crucial insights that inform rapid and effective responses. Advances in simulation modeling and predictive analytics allow for proactive planning, helping authorities anticipate potential emergencies and allocate resources accordingly. AI-driven DSS have the potential to revolutionize public health by facilitating early disease detection, predicting outbreaks, and enhancing medical supply chain logistics. However, the ethical, legal, and operational implications of these technologies must be carefully considered to prevent biases, ensure data protection, and maintain human oversight in decision-making. As AI and other emerging technologies continue to evolve, continuous research, policy refinement, and cross-sector collaboration will be necessary to maximize their benefits while mitigating risks.

In conclusion, advances in decision-support frameworks for emergency response and public health resource allocation have introduced significant improvements in crisis management, but their successful implementation requires addressing key challenges related to transparency, security, and governance. Interdisciplinary collaboration is essential for creating robust, ethical, and effective DSS that can be seamlessly integrated into existing infrastructures. The role of emerging technologies, particularly AI and blockchain, will continue to expand, offering new possibilities for improving decision-making, enhancing resource distribution, and strengthening global emergency preparedness. With continued investment, regulatory oversight, and cross-sector engagement, AI-driven DSS can become indispensable tools for safeguarding public health and responding efficiently to emergencies.

References

1. Abiola, O. A., Okeke, I. C., & Ajani, O. B. (2024). Integrating taxation, financial controls, and risk management: a comprehensive model for small and medium enterprises to foster economic resilience. *International Journal of Management & Entrepreneurship Research. P-ISSN*, 2664-3588.
2. Abiola, O. A., Okeke, I. C., & Ajani, O. B. (2024). The role of tax policies in shaping the digital economy Addressing challenges and harnessing opportunities for sustainable growth. *International Journal of advanced Economics. P-ISSN*, 2707-2134.
3. Abiola-Adams, O., Azubuike, C., Sule, A. K., & Okon, R. (2023). Innovative Approaches to Structuring Sharia-Compliant Financial Products for Global Markets.
4. Abiola-Adams, O., Azubuike, C., Sule, A. K., & Okon, R. (2023). Risk Management and Hedging Techniques in Islamic Finance: Addressing Market Volatility without Conventional Derivatives.
5. Abiola-Adams, O., Azubuike, C., Sule, A. K., & Okon, R. (2025). Integrating asset and liability management with Islamic Finance: A strategic framework for global financial institutions. *Gulf Journal of Advance Business Research*, *3*(1), 128-142.
6. Abiola-Adams, O., Azubuike, C., Sule, A. K., & Okon, R. (2025). Impact of regulatory changes on strategic treasury operations in a post-COVID-19 world. *Gulf Journal of Advance Business Research*, *3*(1), 172-185.
7. Abiola-Adams, O., Azubuike, C., Sule, A. K., & Okon, R. (2025). Strategic liquidity management: Best practices for optimizing cash flows in multinational corporations. *Gulf Journal of Advance Business Research*, *3*(1), 143-156.
8. Abiola-Adams, O., Azubuike, C., Sule, A. K., & Okon, R. (2025). The impact of Islamic finance on global asset and liability management practices. *Gulf Journal of Advance Business Research*, *3*(1), 186-200.

9. Abiola-Adams, O., Azubuike, C., Sule, A. K., & Okon, R. (2025). Treasury innovation: The role of technology in enhancing strategic treasury operations and financial performance. *Gulf Journal of Advance Business Research*, *3*(1), 157-171.
10. Adegoke, S. A., Oladimeji, O. I., Akinlosotu, M. A., Akinwumi, A. I., & Matthew, K. A. (2022). HemoTypeSC point-of-care testing shows high sensitivity with alkaline cellulose acetate hemoglobin electrophoresis for screening hemoglobin SS and SC genotypes. *Hematology, Transfusion and Cell Therapy*, *44*(3), 341-345.
11. Adekola, A.D., Alli, O.I., Mbata, A.O. & Ogbeta, C.P., 2023. Integrating multisectoral strategies for tobacco control: Evidence-based approaches and public health outcomes. International Journal of Medical and All Body Health Research, 4(1), pp.60-69. DOI: https://doi.org/10.54660/IJMBHR.2024.4.1.60-69.
12. Adekoya, O. O., Daudu, C. D., Okoli, C. E., Isong, D., Adefemi, A., & Tula, O. A. (2024). The role of environmental policies in shaping oil and gas operations: A comparative review of Africa and the USA. *International Journal of Science and Research Archive*, *11*(1), 798-806.
13. Adekoya, O. O., Isong, D., Daudu, C. D., Adefemi, A., Okoli, C. E., & Tula, O. A. (2024). Reviewing the advancements in offshore drilling technologies in the USA and their global impact. *World Journal of Advanced Research and Reviews*, *21*(1), 2242-2249.
14. Adelodun, A. M., Adekanmi, A. J., Roberts, A., & Adeyinka, A. O. (2018). Effect of asymptomatic malaria parasitemia on the uterine and umbilical artery blood flow impedance in third-trimester singleton Southwestern Nigerian pregnant women. *Tropical Journal of Obstetrics and Gynaecology*, *35*(3), 333-341.
15. Adelodun, M. O., & Anyanwu, E. C. (2024). A critical review of public health policies for radiation protection and safety.
16. Adelodun, M. O., & Anyanwu, E. C. (2024). Environmental and patient safety: Advances in radiological techniques to reduce radiation exposure.
17. Adelodun, M. O., & Anyanwu, E. C. (2024). Evaluating the Environmental Impact of Innovative Radiation Therapy Techniques in Cancer Treatment.
18. Adelodun, M. O., & Anyanwu, E. C. (2024). Global Standards in Radiation Safety: A Comparative Analysis of Healthcare Regulations.
19. Adelodun, M. O., & Anyanwu, E. C. (2024). Health Effects of Radiation: An Epidemiological Study on Populations near Nuclear Medicine Facilities. *Health*, *13*(9), 228-239.
20. Adelodun, M. O., & Anyanwu, E. C. (2024). Integrating radiological technology in environmental health surveillance to enhance public safety.
21. Adelodun, M. O., & Anyanwu, E. C. (2025). Recent Advances in Diagnostic Radiation and Proposals for Future Public Health Studies.
22. Adelodun, M., & Anyanwu, E. (2024). Comprehensive risk management and safety strategies in radiation use in medical imaging. *Int J Front Med Surg Res*, *6*.
23. Adenusi, A., Obi, E., Asifat, O., Magacha, H., Ayinde, A., & Changela, M. (2024). Social determinants of therapeutic endoscopy and procedure time in patients with acute

upper gastrointestinal bleeding. *The American Journal of Gastroenterology, 119*(10S), S581. https://doi.org/10.14309/01.ajg.0001032740.72909.5b
24. Adenusi, A., Obi, E., Asifat, O., Magacha, H., Ayinde, A., & Changela, M. (2024). S843 Social Determinants of Therapeutic Endoscopy and Procedure Time in Patients With Acute Upper Gastrointestinal Bleeding. *Official journal of the American College of Gastroenterology| ACG*, *119*(10S), S581.
25. Adepoju, P. A., Sule, A. K., Ikwuanusi, U. F., Azubuike, C., & Odionu, C. S. (2024). Enterprise architecture principles for higher education: Bridging technology and stakeholder goals. International Journal of Applied Research in Social Sciences, 6(12), 2997-3009. https://doi.org/10.51594/ijarss.v6i12.1785
26. Aderinwale, O., Zheng, S., Mensah, E. A., Boateng, I., Koroma, F. B., Nwajiugo, R. C., ... & Itopa, M. O. (2024). Sociodemographic and behavioral determinants of cervical cancer screening among adult women in the United States.
27. Adewoyin, M. A. (2021). Developing frameworks for managing low-carbon energy transitions: overcoming barriers to implementation in the oil and gas industry.
28. Adewoyin, M. A. (2022). Advances in risk-based inspection technologies: Mitigating asset integrity challenges in aging oil and gas infrastructure.
29. Adewoyin, M. A., Onyeke, F. O., Digitemie, W. N., & Dienagha, I. N. (2025). Holistic Offshore Engineering Strategies: Resolving Stakeholder Conflicts and Accelerating Project Timelines for Complex Energy Projects.
30. Adewumi, A., Ewim, S. E., Sam-Bulya, N. J., & Ajani, O. B. (2024). Enhancing financial fraud detection using adaptive machine learning models and business analytics. *International Journal of Science and Research Update.* https://doi.org/10.53430/ijsru.2024.8.2.0054
31. Adewumi, A., Ewim, S. E., Sam-Bulya, N. J., & Ajani, O. B. (2024). Leveraging business analytics to build cyber resilience in fintech: Integrating AI and governance, risk, and compliance (GRC) models. *International Journal of Management Research Update*. https://doi.org/10.53430/ijmru.2024.8.2.0050
32. Adewumi, A., Ewim, S. E., Sam-Bulya, N. J., & Ajani, O. B. (2024). Advancing business performance through data-driven process automation: A case study of digital transformation in the banking sector. *International Journal of Management Research Update*. https://doi.org/10.53430/ijmru.2024.8.2.0049
33. Adewumi, A., Ewim, S. E., Sam-Bulya, N. J., & Ajani, O. B. (2024). Strategic innovation in business models: Leveraging emerging technologies to gain a competitive advantage. *International Journal of Management & Entrepreneurship Research, 6*(10), 3372-3398.
34. Adewumi, A., Ewim, S. E., Sam-Bulya, N. J., & Ajani, O. B. (2024). Enhancing financial fraud detection using adaptive machine learning models and business analytics. *International Journal of Science and Research Update.* https://doi.org/10.53430/ijsru.2024.8.2.0054
35. Adewumi, A., Ibeh, C. V., Asuzu, O. F., Adelekan, O. A. A., Awonnuga, K. F., & Daraojimba, O. D. (2024). Data analytics in retail banking: A review of customer

insights and financial services innovation. *Bulletin of Social and Economic Sciences,* 1(2024), 16. http://doi.org/10.26480/bosoc.01.2024.16

36. Adewumi, A., Nwaimo, C. S., Ajiga, D., Agho, M. O., & Iwe, K. A. (2023). AI and data analytics for sustainability: A strategic framework for risk management in energy and business. *International Journal of Science and Research Archive, 3*(12), 767–773.
37. Adewumi, A., Ochuba, N. A., & Olutimehin, D. O. (2024). The role of AI in financial market development: Enhancing efficiency and accessibility in emerging economies. *Finance & Accounting Research Journal,* 6(3), 421–436. Retrieved from www.fepbl.com/index.php/farj
38. Adewumi, A., Oshioste, E. E., Asuzu, O. F., Ndubuisi, L. N., Awonnuga, K. F., & Daraojim, O. H. (2024). Business intelligence tools in finance: A review of trends in the USA and Africa. *World Journal of Applied Research*, 21(3), 333. https://doi.org/10.30574/wjarr.2024.21.3.0333
39. Agbede, O. O., Egbuhuzor, N. S., Ajayi, A. J., Akhigbe, E. E., Ewim, C. P.-M., & Ajiga, D. I. (2023). *Artificial intelligence in predictive flow management: Transforming logistics and supply chain operations*. *International Journal of Management and Organizational Research, 2*(1), 48-63. www.themanagementjournal.com
40. Agho, G., Aigbaifie, K., Ezeh, M. O., Isong, D., & Oluseyi. (2022). Advancements in green drilling technologies: Integrating carbon capture and storage (CCS) for sustainable energy production. *World Journal of Advanced Research and Reviews, 13*(2), 995–1011. https://doi.org/10.30574/ijsra.2023.8.1.0074
41. Agho, G., Aigbaifie, K., Ezeh, M. O., Isong, D., & Oluseyi. (2023). Sustainability and carbon capture in the energy sector: A holistic framework for environmental innovation. *Magna Scientia Advanced Research and Reviews, 9*(2), 195–203. https://doi.org/10.30574/msarr.2023.9.2.0155
42. Agho, G., Ezeh, M. O., Isong, D., Iwe, K. A., & Oluseyi. (2023). Commercializing the future: Strategies for sustainable growth in the upstream oil and gas sector. *Magna Scientia Advanced Research and Reviews, 8*(1), 203–211. https://doi.org/10.30574/msarr.2023.8.1.0086
43. Agho, G., Ezeh, M. O., Isong, M., Iwe, D., & Oluseyi, K. A. (2021). Sustainable pore pressure prediction and its impact on geo-mechanical modelling for enhanced drilling operations. *World Journal of Advanced Research and Reviews, 12*(1), 540–557. https://doi.org/10.30574/wjarr.2021.12.1.0536
44. Agho, M. O., Eyo-Udo, N. L., Onukwulu, E. C., Sule, A. K., & Azubuike, C. (2024). Digital Twin Technology for Real-Time Monitoring of Energy Supply Chains. *International Journal of Research and Innovation in Applied Science*, *9*(12), 564-592.
45. Ajayi, A. & Akerele, J. I. (2021). A High-Impact Data-Driven Decision-Making Model for Integrating Cutting-Edge Cybersecurity Strategies into Public Policy, Governance, and Organizational Frameworks. International Journal of Multidisciplinary Research and Growth Evaluation, 2(1), pp. 623-637. DOI: https://doi.org/10.54660/IJMRGE.2021.2.1.623-637.

46. Ajayi, A. & Akerele, J. I. (2022). A Scalable and Impactful Model for Harnessing Artificial Intelligence and Cybersecurity to Revolutionize Workforce Development and Empower Marginalized Youth. International Journal of Multidisciplinary Research and Growth Evaluation, 3(1), pp. 714-719. DOI: https://doi.org/10.54660/IJMRGE.2022.3.1.714-719.
47. Ajayi, A. & Akerele, J. I.(2022). A Practical Framework for Advancing Cybersecurity, Artificial Intelligence and Technological Ecosystems to Support Regional Economic Development and Innovation. International Journal of Multidisciplinary Research and Growth Evaluation, 3(1), pp. 700-713. DOI: https://doi.org/10.54660/IJMRGE.2022.3.1.700-713.
48. Ajayi, A., Akerele, J. I., Odio, P. E., Collins, A., Babatunde, G. O. & Mustapha, S. D. (2025). Using AI and Machine Learning to Predict and Mitigate Cybersecurity Risks in Critical Infrastructure. International Journal of Engineering Research and Development, 21(2), pp. 205-224.
49. Ajiga, D. I., Adeleye, R. A., Asuzu, O. F., Owolabi, O. R., Bello, B. G., & Ndubuisi, N. L. (2024). Review of AI techniques in financial forecasting: applications in stock market analysis. *Finance & Accounting Research Journal*, *6*(2), 125-145.
50. Ajiga, D. I., Adeleye, R. A., Tubokirifuruar, T. S., Bello, B. G., Ndubuisi, N. L., Asuzu, O. F., & Owolabi, O. R. (2024). Machine learning for stock market forecasting: a review of models and accuracy. *Finance & Accounting Research Journal*, *6*(2), 112-124.
51. Ajiga, D. I., Hamza, O., Eweje, A., Kokogho, E., & Odio, P. E. (2024). Assessing the role of HR analytics in transforming employee retention and satisfaction strategies. International Journal of Social Science Exceptional Research, 3(1), 87-94. https://doi.org/10.54660/IJSSER.2024.3.1.87-94:contentReference[oaicite:0]{index=0}.
52. Ajiga, D. I., Hamza, O., Eweje, A., Kokogho, E., & Odio, P. E. (2024). Exploring how predictive analytics can be leveraged to anticipate and meet emerging consumer demands. International Journal of Social Science Exceptional Research, 3(1), 80-86. https://doi.org/10.54660/IJSSER.2024.3.1.80-86:contentReference[oaicite:1]{index=1}.
53. Ajiga, D. I., Hamza, O., Eweje, A., Kokogho, E., & Odio, P. E. (2024). Investigating the use of big data analytics in predicting market trends and consumer behavior. International Journal of Management and Organizational Research, 4(1), 62-69. https://doi.org/10.54660/IJMOR.2024.3.1.62-69:contentReference[oaicite:2]{index=2}.
54. Ajiga, D. I., Hamza, O., Eweje, A., Kokogho, E., & Odio, P. E. (2024). Evaluating Agile's impact on IT financial planning and project management efficiency. International Journal of Management and Organizational Research, 3(1), 70-77. https://doi.org/10.54660/IJMOR.2024.3.1.70-77:contentReference[oaicite:3]{index=3}.
55. Ajiga, D. I., Hamza, O., Eweje, A., Kokogho, E., & Odio, P. E. (2024). *Assessing the role of HR analytics in transforming employee retention and satisfaction strategies*.

56. Alves, M., Seringa, J., Silvestre, T., & Magalhães, T. (2024). Use of artificial intelligence tools in supporting decision-making in hospital management.. https://doi.org/10.21203/rs.3.rs-4491119/v1
57. Amândio, M., Parente, M., Neves, J., & Fonseca, P. (2021). Integration of smart pavement data with decision support systems: a systematic review. Buildings, 11(12), 579. https://doi.org/10.3390/buildings11120579
58. Basiru, J. O., Ejiofor, C. L., & Ekene Cynthia Onukwulu & Attah, R. U. (2023). Enhancing financial reporting systems: A conceptual framework for integrating data analytics in business decision-making. *IRE Journals,[online]*, *7*(4), 587-606.
59. Basiru, J. O., Ejiofor, C. L., Onukwulu, E. C., & Attah, R. U. (2023). The Impact of Contract Negotiations on Supplier Relationships: A Review of Key Theories and Frameworks for Organizational Efficiency. International Journal of Multidisciplinary Research and Growth Evaluation, 4(1), 788–802. https://doi.org/10.54660/.ijmrge.2023.4.1.788-802
60. Basiru, J. O., Ejiofor, C. L., Onukwulu, E. C., & Attah, R. U. (2023). Sustainable Procurement in Multinational Corporations: A Conceptual Framework for Aligning Business and Environmental Goals. International Journal of Multidisciplinary Research and Growth Evaluation, 4(1), 774–787. https://doi.org/10.54660/.ijmrge.2023.4.1.774-787
61. Basiru, J. O., Ejiofor, C. L., Onukwulu, E. C., & Attah, R. U. (2023). Optimizing Administrative Operations: A Conceptual Framework for Strategic Resource Management in Corporate Settings. International Journal of Multidisciplinary Research and Growth Evaluation, 4(1), 760–773. https://doi.org/10.54660/.ijmrge.2023.4.1.760-773
62. Basiru, J.O., Ejiofor, C.L., Ekene Cynthia Onukwulu and Attah, R.U. (2023). Enhancing Financial Reporting Systems: A Conceptual Framework for Integrating Data Analytics in Business Decision-Making. IRE Journals, [online] 7(4), pp.587–606. Available at: https://www.irejournals.com/paper-details/1705166
63. Basiru, J.O., Ejiofor, C.L., Onukwulu, E.C and Attah, R.U (2023). Financial management strategies in emerging markets: A review of theoretical models and practical applications. Magna Scientia Advanced Research and Reviews, 7(2), pp.123–140. doi:https://doi.org/10.30574/msarr.2023.7.2.0054.
64. Basiru, J.O., Ejiofor, C.L., Onukwulu, E.C and Attah, R.U. (2022). Streamlining procurement processes in engineering and construction companies: A comparative analysis of best practices. Magna Scientia Advanced Research and Reviews, 6(1), pp.118–135. doi:https://doi.org/10.30574/msarr.2022.6.1.0073.
65. Basiru, J.O., Ejiofor, C.L., Onukwulu, E.C., and Attah, R.U. (2023). Corporate Health and Safety Protocols: A Conceptual Model for Ensuring Sustainability in Global Operations. IRE Journals, [online] 6(8), pp.324–343. Available at: https://www.irejournals.com/paper-details/1704115
66. Basiru, J.O., Ejiofor, C.L., Onukwulu, E.C., and Attah, R.U. (2023). Adopting Lean Management Principles in Procurement: A Conceptual Model for Improving Cost-

Efficiency and Process Flow. IRE Journals, [online] 6(12), pp.1503–1522. Available at: https://www.irejournals.com/paper-details/1704686

67. Bidemi, A. I., Oyindamola, F. O., Odum, I., Stanley, O. E., Atta, J. A., Olatomide, A. M., ... & Helen, O. O. (2021). Challenges Facing Menstruating Adolescents: A Reproductive Health Approach. *Journal of Adolescent Health*, *68*(5), 1-10.
68. Boyd, A., Chambers, N., French, S., Shaw, D., King, R., & Whitehead, A. (2014). Emergency planning and management in health care: priority research topics. Health Systems, 3(2), 83-92.
69. Bristol-Alagbariya B., Ayanponle LO., Ogedengbe DE. (2024): Advanced strategies for managing industrial and community relations in high-impact environments. International Journal of Science and Technology Research Archive. 2024;7(2):076–083. DOI
70. Bristol-Alagbariya B., Ayanponle LO., Ogedengbe DE. (2022): Developing and implementing advanced performance management systems for enhanced organizational productivity. World Journal of Advanced Science and Technology. 2022;2(1):39–46. DOI
71. Bristol-Alagbariya B., Ayanponle LO., Ogedengbe DE. (2022): Integrative HR approaches in mergers and acquisitions ensuring seamless organizational synergies. Magna Scientia Advanced Research and Reviews. 2022;6(1):78–85. DOI
72. Bristol-Alagbariya B., Ayanponle LO., Ogedengbe DE. (2022): Strategic frameworks for contract management excellence in global energy HR operations. GSC Advanced Research and Reviews. 2022;11(3):150–157. DOI
73. Bristol-Alagbariya B., Ayanponle LO., Ogedengbe DE. (2023): Frameworks for enhancing safety compliance through HR policies in the oil and gas sector. International Journal of Scholarly Research in Multidisciplinary Studies. 2023;3(2):25–33. DOI
74. Bristol-Alagbariya B., Ayanponle LO., Ogedengbe DE. (2023): Human resources as a catalyst for corporate social responsibility: Developing and implementing effective CSR frameworks. International Journal of Multidisciplinary Research Updates. 2023;6(1):17–24.
75. Bristol-Alagbariya B., Ayanponle LO., Ogedengbe DE. (2024): Operational efficiency through HR management: Strategies for maximizing budget and personnel resources. International Journal of Management & Entrepreneurship Research. 2024;6(12):3860–3870. DOI
76. Bristol-Alagbariya B., Ayanponle LO., Ogedengbe DE. (2024): Sustainable business expansion: HR strategies and frameworks for supporting growth and stability. International Journal of Management & Entrepreneurship Research. 2024;6(12):3871–3882. DOI
77. Bristol-Alagbariya B., Ayanponle LO., Ogedengbe DE. (2024): Utilization of HR analytics for strategic cost optimization and decision-making. International Journal of Scientific Research Updates. 2023;6(2):62–69. DOI
78. Bristol-Alagbariya, B., Ayanponle, O. L., & Ogedengbe, D. E. (2022). Integrative HR approaches in mergers and acquisitions ensuring seamless organizational synergies.

Magna Scientia Advanced Research and Reviews, *6*(01), 078–085. Magna Scientia Advanced Research and Reviews.

79. Bristol-Alagbariya, B., Ayanponle, O. L., & Ogedengbe, D. E. (2022). Strategic frameworks for contract management excellence in global energy HR operations. *GSC Advanced Research and Reviews*, *11*(03), 150–157. GSC Advanced Research and Reviews.
80. Bristol-Alagbariya, B., Ayanponle, O. L., & Ogedengbe, D. E. (2022). Developing and implementing advanced performance management systems for enhanced organizational productivity. *World Journal of Advanced Science and Technology*, *2*(01), 039–046. World Journal of Advanced Science and Technology.
81. Bristol-Alagbariya, B., Ayanponle, O. L., & Ogedengbe, D. E. (2023). Utilization of HR analytics for strategic cost optimization and decision making. *International Journal of Scientific Research Updates*, *6*(02), 062–069. International Journal of Scientific Research Updates.
82. Bristol-Alagbariya, B., Ayanponle, O. L., & Ogedengbe, D. E. (2023). Human resources as a catalyst for corporate social responsibility: Developing and implementing effective CSR frameworks. *International Journal of Multidisciplinary Research Updates*, *6*(01), 017–024. International Journal of Multidisciplinary Research Updates.
83. Bristol-Alagbariya, B., Ayanponle, O. L., & Ogedengbe, D. E. (2023). Frameworks for enhancing safety compliance through HR policies in the oil and gas sector. *International Journal of Scholarly Research in Multidisciplinary Studies*, *3*(02), 025–033. International Journal of Scholarly Research in Multidisciplinary Studies.
84. Bristol-Alagbariya, B., Ayanponle, O. L., & Ogedengbe, D. E. (2024). Leadership development and talent management in constrained resource settings: A strategic HR perspective. *Comprehensive Research and Reviews Journal*, *2*(02), 013–022. Comprehensive Research and Reviews Journal.
85. Bristol-Alagbariya, B., Ayanponle, O. L., & Ogedengbe, D. E. (2024). Advanced strategies for managing industrial and community relations in high-impact environments. *International Journal of Science and Technology Research Archive*, *7*(02), 076–083. International Journal of Science and Technology Research Archive.
86. Bristol-Alagbariya, B., Ayanponle, O. L., & Ogedengbe, D. E. (2024). Operational efficiency through HR management: Strategies for maximizing budget and personnel resources. *International Journal of Management & Entrepreneurship Research*, *6*(12), 3860–3870. Fair East Publishers.
87. Chigboh, V. M., Zouo, S. J. C., & Olamijuwon, J. (2024). *Health data analytics for precision medicine: A review of current practices and future directions*. *International Medical Science Research Journal,* *4*(11), 973-984. https://www.fepbl.com/index.php/imsrj/article/view/1732
88. Chigboh, V. M., Zouo, S. J. C., & Olamijuwon, J. (2024). *Predictive analytics in emergency healthcare systems: A conceptual framework for reducing response times and improving patient care*. *World Journal of Advanced Pharmaceutical and Medical*

Research, *07*(2), 119–127. https://zealjournals.com/wjapmr/content/predictive-analytics-emergency-healthcare-systems-conceptual-framework-reducing-response
89. Chintoh, G. A., Segun-Falade, O. D., Odionu, C. S., & Ekeh, A. H. (2024). Legal and ethical challenges in AI governance: A conceptual approach to developing ethical compliance models in the U.S. *International Journal of Social Science Exceptional Research*, *3*(1), 103-109. https://doi.org/10.54660/IJSSER.2024.3.1.103-109
90. Chintoh, G. A., Segun-Falade, O. D., Odionu, C. S., & Ekeh, A. H. (2025). Cross-jurisdictional data privacy compliance in the U.S.: Developing a new model for managing AI data across state and federal laws. *Gulf Journal of Advanced Business Research*, *3*(2), 537-548. https://doi.org/10.51594/gjabr.v3i2.96
91. Chintoh, G. A., Segun-Falade, O. D., Odionu, C. S., & Ekeh, A. H. (2025). The role of AI in U.S. consumer privacy: Developing new concepts for CCPA and GLBA compliance in smart services. *Gulf Journal of Advanced Business Research*, *3*(2), 549-560. https://doi.org/10.51594/gjabr.v3i2.97
92. Chintoh, G. A., Segun-Falade, O. D., Odionu, C. S., & Ekeh, A. H. (2024). Developing a compliance model for AI in U.S. privacy regulations.
93. Chintoh, G. A., Segun-Falade, O. D., Odionu, C. S., & Ekeh, A. H. (2024). Proposing a Data Privacy Impact Assessment (DPIA) model for AI projects under U.S. privacy regulations. *International Journal of Social Science Exceptional Research*, *3*(1), 95-102. https://doi.org/10.54660/IJSSER.2024.3.1.95-102
94. Chintoh, G. A., Segun-Falade, O. D., Odionu, C. S., & Ekeh, A. H. (2024). Developing a Compliance Model for AI-Driven Financial Services: Navigating CCPA and GLBA Regulations.
95. Chintoh, G. A., Segun-Falade, O. D., Odionu, C. S., & Ekeh, A. H. (2024). International Journal of Social Science Exceptional Research.
96. Dienagha, I. N., Onyeke, F. O., Digitemie, W. N., & Adekunle, M. (2021). Strategic reviews of greenfield gas projects in Africa: Lessons learned for expanding regional energy infrastructure and security.
97. Digitemie, W. N., Onyeke, F. O., Adewoyin, M. A., & Dienagha, I. N. (2025). Implementing Circular Economy Principles in Oil and Gas: Addressing Waste Management and Resource Reuse for Sustainable Operations.
98. Drakeford, O. M., & Majebi, N. L. (2024). *Advancing personalized autism interventions in the U.S.: A data analytics-driven conceptual framework for social work*. *International Journal of Engineering Research and Development, 22*(12), 385-391.
99. Drakeford, O. M., & Majebi, N. L. (2024). *Reimagining autism research in the U.S.: A synergistic approach between social work, public health, and data analytics*. *International Journal of Applied Research in Social Sciences, 6*(12), 2916-2928.
100. Drakeford, O. M., & Majebi, N. L. (2024). *Social determinants of autism in the U.S.: Conceptualizing a public health analytics framework to address health disparities*. *IRE Journals, 8*(6), 264-273.
101. Drakeford, O. M., & Majebi, N. L. (2024). *Social work, analytics, and public health in autism: A conceptual approach to enhancing community health outcomes in*

U.S. underserved areas. *International Journal of Frontiers in Science and Technology Research, 7*(2), 100-108.

102. Drakeford, O. M., & Majebi, N. L. (2024). *Transforming autism care in the U.S.: Conceptualizing a data-driven, social work-based framework for early diagnosis and intervention*. *International Journal of Frontiers in Medicine and Surgery Research, 6*(2), 117-125. https://doi.org/10.53294/ijfmsr.2024.6.2.0051

103. Edoh, N. L. (2021). *Evaluation Of Postharvest Physiological Deterioration Of Transgenic High Deta-Carotene CassavA* (Doctoral dissertation).

104. Edoh, N. L., Adiele, J., Ndukwe, I., Ogbokiri, H., Njoku, D. N., & Egesi, C. N. (2016, December). Evaluation of high beta carotene cassava genotypes at advanced trial in Nigeria. In *The open conference proceedings Journal* (Vol. 7, pp. 144-148).

105. Edoh, N. L., Chigboh, V. M., Zouo, S. J. C., & Olamijuwon, J. (2024). *Improving healthcare decision-making with predictive analytics: A conceptual approach to patient risk assessment and care optimization*. *International Journal of Scholarly Research in Medicine and Dentistry, 03*(2), 001–010. https://srrjournals.com/ijsrmd/sites/default/files/IJSRMD-2024-0034.pdf

106. Edoh, N. L., Chigboh, V. M., Zouo, S. J. C., & Olamijuwon, J. (2024). *The role of data analytics in reducing healthcare disparities: A review of predictive models for health equity*. *International Journal of Management & Entrepreneurship Research, 6*(11), 3819-3829. https://www.fepbl.com/index.php/ijmer/article/view/1721

107. Edoh, N. L., Chigboh, V. M., Zouo, S. J., & Olamijuwon, J. (2024). Improving healthcare decision-making with predictive analytics: A conceptual approach to patient risk assessment and care optimization.

108. Edoh, N. L., Ukpabi, U. J., & Igol, J. O. (2021). Untargeted metabolomics profiling of high beta carotene cassava with respect to postharvest physiological deterioration.

109. Edoh, N. L., Ukpabi, U. J., & Igoli, J. O. (2021). Effect of scopoletin and carotenoids on postharvest physiological deterioration (PPD) of transgenic high beta carotene cassava. *Journal of Food Research*, *10*(4), 9-15.

110. Edoh, N. L., Ukpabi, U. J., Igoli, J. O., & Evans, B. S. (2018). Biochemical characteristics of fresh roots of transgenic high Beta-carotene cassava. *Nigeria Agricultural Journal*, *49*(2), 131-135.

111. Efobi, C. C., Nri-ezedi, C. A., Madu, C. S., Obi, E., Ikediashi, C. C., & Ejiofor, O. (2023). A Retrospective Study on Gender-Related Differences in Clinical Events of Sickle Cell Disease: A Single Centre Experience. *Tropical Journal of Medical Research*, *22*(1), 137-144.

112. Efobi, C. C., Obi, E. S., Faniyi, O., Offiah, C. E., Okam, O. V., Ndubuisi, O. J., ... & Umeh, O. E. (2025). The impact of ABO blood group on the prevalence of transfusion-transmitted infections among blood donors in a tertiary-care hospital. *American Journal of Clinical Pathology*, aqae162.

113. Egbuhuzor, N. S., Ajayi, A. J., Akhigbe, E. E., Agbede, O. O., Ewim, C. P. M., & Ajiga, D. I. (2025). AI and data-driven insights: Transforming customer relationship

management (CRM) in financial services. *Gulf Journal of Advance Business Research*, *3*(2), 483-511.

114. Ekeh, A. H., Apeh, C. E., Odionu, C. S., & Austin-Gabriel, B. (2025). Automating Legal Compliance and Contract Management: Advances in Data Analytics for Risk Assessment, Regulatory Adherence, and Negotiation Optimization.

115. Ekeh, A. H., Apeh, C. E., Odionu, C. S., & Austin-Gabriel, B. (2025). Data analytics and machine learning for gender-based violence prevention: A framework for policy design and intervention strategies. *Gulf Journal of Advance Business Research*, *3*(2), 323-347.

116. Ekeh, A. H., Apeh, C. E., Odionu, C. S., & Austin-Gabriel, B. (2025). Leveraging machine learning for environmental policy innovation: Advances in Data Analytics to address urban and ecological challenges. *Gulf Journal of Advance Business Research*, *3*(2), 456-482.

117. Ekeh, A. H., Apeh, C. E., Odionu, C. S., & Austin-Gabriel, B. (2025). Advanced Data Warehousing and Predictive Analytics for Economic Insights: A Holistic Framework for Stock Market Trends and GDP Analysis.

118. Elufioye, O. A., Ndubuisi, N. L., Daraojimba, R. E., Awonuga, K. F., Ayanponle, L. O., & Asuzu, O. F. (2024). Reviewing employee well-being and mental health initiatives in contemporary HR Practices. *International Journal of Science and Research Archive*, *11*(1), 828-840.

119. Elugbaju, W. K., Okeke, N. I., & Alabi, O. A. (2024). Conceptual framework for enhancing decision-making in higher education through data-driven governance. *Global Journal of Advanced Research and Reviews*, *2*(02), 016-030.

120. Elugbaju, W. K., Okeke, N. I., & Alabi, O. A. (2024). Human Resource Analytics as a Strategic Tool for Workforce Planning and Succession Management. *International Journal Of Engineering Research And Development*, *20*(11), 744-756.

121. Elugbaju, W. K., Okeke, N. I., & Alabi, O. A. (2024). SaaS-based reporting systems in higher education: A digital transition framework for operational resilience. *International Journal of Applied Research in Social Sciences*, *6*(10).

122. Ewim, C. P.-M., Alabi, O. A., Okeke, N. I., Igwe, A. N., & Ofodile, O. C. (2024). *Omni-channel customer experience framework: Enhancing service delivery in SMEs*. *World Journal of Advanced Research and Reviews, 24*(2), 655-670. WJARR.

123. Ewim, C. P.-M., Bristol, B., Eyo-Udo, N. L., Apeh, C. E., & Udeh, C. A. (2025). *Performance management evolution in organizations: An HR review of modern approaches and techniques*. *Account and Financial Management Journal, 10*(1), 2456-3374.

124. Ewim, C. P.-M., Bristol-Alagbariya, B., Eyo-Udo, N. L., Apeh, C. E., & Udeh, C. A. (2025). *Digital banking in Africa: A review of recent developments and challenges*. *Account and Financial Management Journal, 10*(1), 3457-3466.

125. Ewim, C. P.-M., Bristol-Alagbariya, B., Eyo-Udo, N. L., Apeh, C. E., & Udeh, C. A. (2025). *The evolution of blockchain technology in accounting: A review of its*

implications for transparency and accountability. *Account and Financial Management Journal, 10*(1), 3467-3478.

126. Ewim, C. P.-M., Bristol-Alagbariya, B., Eyo-Udo, N. L., Apeh, C. E., & Udeh, C. A. (2025). *Reviewing the role of networking in business success: USA and global perspective*. *International Journal of Multidisciplinary Research and Growth Evaluation, 6*(1), 820-826.
127. Ewim, C. P.-M., Okeke, N. I., Alabi, O. A., Igwe, A. N., & Ofodile, O. C. (2024). *AI in customer feedback integration: A data-driven framework for enhancing business strategy*. *World Journal of Advanced Research and Reviews, 24*(1), 2036–2052. WJARR.
128. Ewim, C. P.-M., Okeke, N. I., Alabi, O. A., Igwe, A. N., & Ofodile, O. C. (2024). *Personalized customer journeys for underserved communities: Tailoring solutions to address unique needs*. *World Journal of Advanced Research and Reviews, 24*(1), 1988–2003. WJARR.
129. Eyo-Udo, N. L., Agho, M. O., Onukwulu, E. C., Sule, A. K., & Azubuike, C. (2025). Advances in Blockchain Solutions for Secure and Efficient Cross-Border Payment Systems. International Journal of Research and Innovation in Applied Science, IX(XII), 536–563. https://doi.org/10.51584/ijrias.2024.912048
130. Eyo-Udo, N. L., Agho, M. O., Onukwulu, E. C., Sule, A. K., & Azubuike, C. (2024). "Advances in Circular Economy Models for Sustainable Energy Supply Chains." Gulf Journal of Advance Business Research, 2(6), 300–337. DOI: 10.51594/gjabr.v2i6.52.
131. Eyo-Udo, N. L., Agho, M. O., Onukwulu, E. C., Sule, A. K., & Azubuike, C. (2024). "Advances in Green Finance Solutions for Combating Climate Changes and ensuring sustainability." Gulf Journal of Advance Business Research, 2(6), 338–375. DOI: 10.51594/gjabr.v2i6.53
132. Eyo-Udo, N. L., Apeh, C. E., Bristol-Alagbariya, B., Udeh, C. A., & Ewim, C. P. M. (2025). Reviewing the role of networking in business success: USA and global perspectives.
133. Eyo-Udo, N. L., Apeh, C. E., Bristol-Alagbariya, B., Udeh, C. A., & Ewim, C. P. M. (2025). Review of ethical considerations and dilemmas in the field of AI and machine learning.
134. Eyo-Udo, N. L., Apeh, C. E., Bristol-Alagbariya, B., Udeh, C. A., & Ewim, C. P. M. (2025). The Evolution of Blockchain Technology in Accounting: A Review of Its Implications for Transparency and Accountability.
135. Eyo-Udo, N. L., Apeh, C. E., Bristol-Alagbariya, B., Udeh, C. A., & Ewim, C. P. M. (2025). International Trade Law in the Modern World: A Review of Evolving Practices and Agreements.
136. Gbadegesin, J. O., Adekanmi, A. J., Akinmoladun, J. A., & Adelodun, A. M. (2022). Determination of Fetal gestational age in singleton pregnancies: Accuracy of ultrasonographic placenta thickness and volume at a Nigerian tertiary Hospital. *African Journal of Biomedical Research*, *25*(2), 113-119.

137. He, R., Zhang, J., Mao, Y., Degomme, O., & Zhang, W. H. (2020). Preparedness and responses faced during the COVID-19 pandemic in Belgium: an observational study and using the National Open Data. International journal of environmental research and public health, 17(21), 7985.

138. Ibeh, A.I., Oso, O.B., Alli, O.I., & Babarinde, A.O. (2025) 'Scaling healthcare startups in emerging markets: A platform strategy for growth and impact', International Journal of Advanced Multidisciplinary Research and Studies, 5(1), pp. 838-854. Available at: http://www.multiresearchjournal.com/

139. Ikwuanusi, U. F., Azubuike, C., Odionu, C. S., & Sule, A. K. (2022). Leveraging AI to address resource allocation challenges in academic and research libraries. IRE Journals, 5(10), 311.

140. Iwe, K. A., Daramola, G. O., Isong, D. E., Agho, M. O., & Ezeh, M. O. (2023). Real-time monitoring and risk management in geothermal energy production: ensuring safe and efficient operations.

141. Kelvin-Agwu, M. C., Adelodun, M. O., Igwama, G. T., & Anyanwu, E. C. (2024): Enhancing Biomedical Engineering Education: Incorporating Practical Training in Equipment Installation and Maintenance.

142. Kelvin-Agwu, M. C., Adelodun, M. O., Igwama, G. T., & Anyanwu, E. C. (2024): The Impact of Regular Maintenance on the Longevity and Performance of Radiology Equipment.

143. Kelvin-Agwu, M. C., Adelodun, M. O., Igwama, G. T., & Anyanwu, E. C. (2024). Strategies for optimizing the management of medical equipment in large healthcare institutions. *Strategies*, *20*(9), 162-170.

144. Kelvin-Agwu, M. C., Adelodun, M. O., Igwama, G. T., & Anyanwu, E. C. (2024). Advancements in biomedical device implants: A comprehensive review of current technologies. *Int. J. Front. Med. Surg. Res*, *6*, 19-28.

145. Kelvin-Agwu, M. C., Adelodun, M. O., Igwama, G. T., & Anyanwu, E. C. (2024). Integrating biomedical engineering with open-source telehealth platforms: enhancing remote patient monitoring in global healthcare systems. *International Medical Science Research Journal*, *4*(9).

146. Kelvin-Agwu, M. C., Adelodun, M. O., Igwama, G. T., & Anyanwu, E. C. (2024). The role of biomedical engineers in enhancing patient care through efficient equipment management. *International Journal Of Frontiers in Medicine and Surgery Research*, *6*(1), 11-18.

147. Kelvin-Agwu, M. C., Adelodun, M. O., Igwama, G. T., & Anyanwu, E. C. (2024). Innovative approaches to the maintenance and repair of biomedical devices in resource-limited settings.

148. Khan, Y., O'Sullivan, T., Brown, A., Tracey, S., Gibson, J., Généreux, M., ... & Schwartz, B. (2018). Public health emergency preparedness: a framework to promote resilience. BMC public health, 18, 1-16.

149. Kokogho, E., Adeniji, I. E., Olorunfemi, T. A., Nwaozomudoh, M. O., Odio, P. E., & Sobowale, A. (2023). Framework for effective risk management strategies to

mitigate financial fraud in Nigeria's currency operations. International Journal of Management and Organizational Research, 2(6), 209-222.

150. Kokogho, E., Odio, P. E., Ogunsola, O. Y., & Nwaozomudoh, M. O. (2024). Conceptual Analysis of Strategic Historical Perspectives: Informing Better Decision Making and Planning for SMEs.

151. Kokogho, E., Odio, P. E., Ogunsola, O. Y., & Nwaozomudoh, M. O. (2024). Transforming Public Sector Accountability: The Critical Role of Integrated Financial and Inventory Management Systems in Ensuring Transparency and Efficiency.

152. Kokogho, E., Odio, P. E., Ogunsola, O. Y., & Nwaozomudoh, M. O. (2024). AI-Powered Economic Forecasting: Challenges and Opportunities in a Data-Driven World.

153. Kokogho, E., Odio, P. E., Ogunsola, O. Y., & Nwaozomudoh, M. O. (2025). A Cybersecurity framework for fraud detection in financial systems using AI and Microservices. *Gulf Journal of Advance Business Research*, *3*(2), 410-424.

154. Koroma, F., Aderinwale, O. A., Obi, E. S., Campbell, C., Itopa, M. O., Nwajiugo, R. C., ... & Ayo-Bali, O. E. (2024). Socio-demographic and behavioral predictors of Depression among Veterans in the USA.

155. Litvin, A., Коренев, C., Rumovskaya, S., Sartelli, M., Baiocchi, G., Biffl, W., … & Catena, F. (2021). Wses project on decision support systems based on artificial neural networks in emergency surgery. World Journal of Emergency Surgery, 16(1). https://doi.org/10.1186/s13017-021-00394-9

156. Majebi, N. L., Adelodun, M. O., & Anyanwu, E. C. (2024). *Community-based interventions to prevent child abuse and neglect: A policy perspective*. *International Journal of Engineering Inventions, 13*(9), 367–374.

157. Majebi, N. L., Adelodun, M. O., & Anyanwu, E. C. (2024). *Early childhood trauma and behavioral disorders: The role of healthcare access in breaking the cycle*. *Comprehensive Research and Reviews in Science and Technology, 2*(1), 080–090.

158. Majebi, N. L., Adelodun, M. O., & Anyanwu, E. C. (2024). *Integrating trauma-informed practices in US educational systems: Addressing behavioral challenges in underserved communities*. *Comprehensive Research and Reviews in Science and Technology, 2*(1), 070–079.

159. Majebi, N. L., Adelodun, M. O., & Anyanwu, E. C. (2024). *Maternal mortality and healthcare disparities: Addressing systemic inequities in underserved communities*. *International Journal of Engineering Inventions, 13*(9), 375–385.

160. Majebi, N. L., Drakeford, O. M., Adelodun, M. O., & Anyanwu, E. C. (2023). *Leveraging digital health tools to improve early detection and management of developmental disorders in children*. *World Journal of Advanced Science and Technology, 4*(1), 025–032.

161. Malsia, E. and Loku, A. (2024). Generative artificial intelligence in health system management: transformative insights. Journal of Service Science and Management, 17(02), 107-117. https://doi.org/10.4236/jssm.2024.172005

162. Matthew, A., Opia, F. N., Matthew, K. A., Kumolu, A. F., & Matthew, T. F. (2021). Cancer Care Management in the COVID-19 Era: Challenges and adaptations in the global south. *Cancer*, *2*(6).

163. Matthew, K. A., Akinwale, F. M., Opia, F. N., & Adenike, A. (2021). The Relationship between oral Contraceptive Use, Mammographic Breast Density, and Breast Cancer Risk.

164. Matthew, K. A., Getz, K. R., Jeon, M. S., Luo, C., Luo, J., & Toriola, A. T. (2024). Associations of Vitamins and Related Cofactor Metabolites with Mammographic Breast Density in Premenopausal Women. *The Journal of Nutrition*, *154*(2), 424-434.

165. Matthew, K. A., Nwaogelenya, F., & Opia, M. (2024). Conceptual review on the importance of data visualization tools for effective research communication. *International Journal Of Engineering Research and Development*, *20*(11), 1259-1268. https://ijerd.com/paper/vol20-issue11/201112591268.pdf

166. Matthew, K. A., Nwaogelenya, F., & Opia, M. (2025). Culturally sensitive interventions for mental health in vulnerable populations: Bridging gaps in care. *International Journal of Research Publication and Reviews, 6*(1), 2984-2997.

167. Matthew, K. A., Nwaogelenya, F., & Opia, M. (2025). Empowering unrepresented populations through inclusive policy frameworks in global health initiatives. *International Research Journal of Modernization in Engineering Technology and Science, 7*(01).

168. Matthew, K. A., Opia, F. N., & Matthew, A. (2023). Policy solutions for reducing racial and ethnic disparities in cancer mortality. *Journal of Advance Multidisciplinary Research*, *2*(2), 77-85.

169. Matthew, K. A., Vanapali, G. K., Getz, K. R., Jeon, M. S., Luo, C., Guo, X., ... & Toriola, A. T. (2024). Steroid hormone metabolites and mammographic breast density in premenopausal women. *Cancer Research*, *84*(6_Supplement), 4431-4431.

170. Mbakop, R. N. S., Forlemu, A. N., Ugwu, C., Soladoye, E., Olaosebikan, K., Obi, E. S., & Amakye, D. (2024). Racial Differences in Non-variceal Upper Gastrointestinal (GI) Bleeding: A Nationwide Study. *Cureus*, *16*(6).

171. Mbakop, R. N. S., Forlemu, A. N., Ugwu, C., Soladoye, E., Olaosebikan, K., Obi, E. S., & Amakye, D. (2024). Racial differences in non-variceal upper Gastrointestinal (GI) bleeding: A nationwide study. *Cureus*, *16*(6).

172. Mladineo, N., Knezić, S., & Jajac, N. (2011). Decision support system for emergency management on motorway networks. Transportmetrica, 7(1), 45-62. https://doi.org/10.1080/18128600903244669

173. Murphy, K., Ruggiero, E., Upshur, R., Willison, D., Malhotra, N., Cai, J., … & Gibson, J. (2021). Artificial intelligence for good health: a scoping review of the ethics literature. BMC Medical Ethics, 22(1). https://doi.org/10.1186/s12910-021-00577-8

174. Neupane, H., Ahuja, M., Ghimire, A., Itopa, M. O., Osei, P. A., & Obi, E. S. (2024). Excessive alcohol consumption and increased risk of heart attack.

175. Nnagha, E. M., Ademola Matthew, K., Izevbizua, E. A., Uwishema, O., Nazir, A., & Wellington, J. (2023). Tackling sickle cell crisis in Nigeria: the need for newer

therapeutic solutions in sickle cell crisis management–short communication. *Annals of Medicine and Surgery*, *85*(5), 2282-2286.

176. Nwaimo, C. S., Adewumi, A., & Ajiga, D. (2022). Advanced data analytics and business intelligence: Building resilience in risk management. *International Journal of Scientific Research and Applications,* *6*(2), 121. https://doi.org/10.30574/ijsra.2022.6.2.0121

177. Nwaimo, C. S., Adewumi, A., Ajiga, D., Agho, M. O., & Iwe, K. A. (2023). AI and data analytics for sustainability: A strategic framework for risk management in energy and business. *International Journal of Scientific Research and Applications,* *8*(2), 158. https://doi.org/10.30574/ijsra.2023.8.2.0158

178. Nwaozomudoh, M. O. (2024). The role of digital banking solutions in enhancing customer acquisition and retention in competitive markets. *International Journal of Business, Law and Political Science, 1*(12), 28–43. Antis International Publisher.

179. Nwaozomudoh, M. O., Kokogho, E., Odio, P. E., & Ogunsola, O. Y. (2024). Transforming public sector accountability: The critical role of integrated financial and inventory management systems in ensuring transparency and efficiency. *International Journal of Management and Organizational Research, 3*(6), 84–107. ANFO Publication House.

180. Nwaozomudoh, M. O., Kokogho, E., Odio, P. E., & Ogunsola, O. Y. (2024). AI-powered economic forecasting: Challenges and opportunities in a data-driven world. *International Journal of Management and Organizational Research, 3*(6), 74–83. ANFO Publication House.

181. Nwaozomudoh, M. O., Kokogho, E., Odio, P. E., & Ogunsola, O. Y. (2024). Conceptual analysis of strategic historical perspectives: Informing better decision-making and planning for SMEs. *International Journal of Management and Organizational Research, 3*(6), 108–119. ANFO Publication House.

182. Olorunsogo, T., Adenyi, A., Okolo, C., & Babawarun, O. (2024). Ethical considerations in ai-enhanced medical decision support systems: a review. World Journal of Advanced Engineering Technology and Sciences, 11(1), 329-336. https://doi.org/10.30574/wjaets.2024.11.1.0061

183. Önder, M. and Uzun, M. (2022). Roles of artificial intelligence (ai) on covid-19 pandemic crisis management policies. International Journal of Public Administration in the Digital Age, 8(2), 1-13. https://doi.org/10.4018/ijpada.294122

184. Prelipcean, G. and Boşcoianu, M. (2011). Emerging applications of decision support systems (dss) in crisis management.. https://doi.org/10.5772/20832

185. Smith, H., Downer, J., & Ives, J. (2023). Clinicians and ai use: where is the professional guidance?. Journal of Medical Ethics, 50(7), 437-441. https://doi.org/10.1136/jme-2022-108831

186. Steen, O., Pope, A., Rauner, M., Holmberg, N., Woodworth, S., O'Riordan, S., … & Neville, K. (2017). A comprehensive decision support system for enhanced emergency decision management and training., 183-197. https://doi.org/10.1007/978-3-319-68486-4_15

187. Sutton, R., Pincock, D., Baumgart, D., Sadowski, D., Fedorak, R., & Kroeker, K. (2020). An overview of clinical decision support systems: benefits, risks, and strategies for success. NPJ Digital Medicine, 3(1). https://doi.org/10.1038/s41746-020-0221-y
188. Szumilas, D., Ochmann, A., Zięba, K., Bartoszewicz, B., Kubrak, A., Makuch, S., … & Chudek, J. (2024). Evaluation of ai-driven labtest checker for diagnostic accuracy and safety: prospective cohort study. Jmir Medical Informatics, 12, e57162-e57162. https://doi.org/10.2196/57162
189. Wang, J. (2023). Intelligent decision support system for building project management based on artificial intelligence. Journal of Physics Conference Series, 2665(1), 012022. https://doi.org/10.1088/1742-6596/2665/1/012022
190. Wang, L., Chen, X., Zhang, L., Li, L., Huang, Y., Sun, Y., … & Yuan, X. (2023). Artificial intelligence in clinical decision support systems for oncology. International Journal of Medical Sciences, 20(1), 79-86. https://doi.org/10.7150/ijms.77205
191. Zhou, N., Zhang, C., Lv, H., Hao, C., Li, T., Zhu, J., … & Zhang, X. (2018). Concordance study between ibm watson for oncology and clinical practice for patients with cancer in china. The Oncologist, 24(6), 812-819. https://doi.org/10.1634/theoncologist.2018-0255