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**Managing safety and environmental risks in the quality of life in the Kingdom
of Saudi Arabia**

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1. Part One

1.1. Acknowledgment

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1.5. Introduction

The Kingdom of Saudi Arabia places significant importance on managing safety and environmental risks to ensure the quality of life for its residents. As one of the largest countries in the Middle East, Saudi Arabia recognizes the need to balance economic development with the preservation of its natural resources and the well-being of its citizens.

In recent years, Saudi Arabia has implemented various measures to address safety and environmental risks. The government has established regulatory frameworks and institutions to monitor and enforce safety standards across different sectors, including industries, transportation, and construction. These regulations aim to prevent accidents, protect workers' health and safety, and mitigate potential hazards.

In the areas of resource conservation, environmental preservation, and meteorology, the Kingdom of Saudi Arabia has achieved enormous progress. Article (322) of the Statute states that "the State shall take steps to safeguard, preserve, improve the environment as well as prevent its pollution." Therefore, it should come as no surprise that the theme of the environment and preservation has been adopted to be safeguarded throughout the Basic Law of Governance. Given how long it took the federal government to support environmental efforts and protect our natural resources, this is a significant consummation.

Recognizing the value of the natural environment and its preservation, the General Council for Meteorology and the Protection of the Environment, the wise government body in charge of environmental affairs in the Kingdom, has unwavering support. This has a noticeable and palpable effect Saudi Arabia established the Directorate General of Meteorology in 1370–1950. It was later restructured in 1981–1401H to become the Department of Meteorology and Environmental Protection. This department was given the responsibility of being the entity/body that is responsible for environment affairs in the Kingdom of Saudi

Arabia at the national level as well as its role in the field of meteorology. This was done in light of the development and the attention to environmental elements both domestically and internationally, as well as their impact on ambitious development plans and the interaction between development and environmental protection, as well as pollution and deterioration due to rapid economic growth and expansion (mewa, 2023).

The Kingdom of Saudi Arabia's efforts to protect biodiversity have taken many forms, encompassing efforts to maintain its constituent parts in their native environments as well as efforts to develop it in a way that will guarantee its survival and sustainability for upcoming generations. With the help of the International Union for Conservation of Nature's expertise, the Kingdom sought assistance in carrying out the essential biological and social studies and surveys to prepare its national system for protected areas. A 1991 report titled "A national system for preserving wildlife and equitable agricultural growth in the Kingdom of Saudi Arabia" by experts from the Union and NCWCD served as the foundation for the declared network of protected areas that has been in place up to this point. A proposal to preserve 75 areas is part of the system, which was recently updated in response to environmental developments (which includes 62 terrestrial areas, 13 coastal regions and marine areas) (my.gov.sa, 2023).

The Kingdom of Saudi Arabia understands that in order to improve the standard of living for its inhabitants and citizens, safety and hazards to the environment must be managed. Owing to its abundance of natural resources and quick economic growth, the Saudi government has made great efforts to safeguard public health and environmental protection.

Saudi Arabia has put in place extensive laws and procedures aimed at reducing risks and advancing public safety. To monitor safety standards and enforce laws, the government has established a number of

agencies, including the General Directorate of Traffic and the Saudi Civil Defense. These organizations strive to avoid mishaps, maintain fire safety, and efficiently handle emergency situations (Khalil, 2023).

In order to improve safety, the Kingdom has also made large investments in infrastructure development. To ensure the efficient and safe movement of people and goods, this includes building and maintaining public transportation systems, roads, bridges, and airports. Additionally, in order to reduce risks and safeguard communities and workers, the government has put strong safety regulations into place in sectors like construction, petrochemicals, and oil and gas (oecd, 2021).

Regarding environmental hazards, Saudi Arabia has taken steps to preserve its natural resources and the environment, and it recognizes the significance of sustainable development. The nation has put in place environmental laws and guidelines to control pollution, preserve water supplies, and support renewable energy sources. The government's commitment to addressing environmental challenges and moving towards a more sustainable future is demonstrated by initiatives like the National Environmental Strategy and the Saudi Green Initiative (sustain, 2018).

Furthermore, Saudi Arabia has made efforts to increase public awareness of environmental issues. Sustainable behaviors and responsible environmental practices are the goals of partnerships with international organizations, public initiatives, and educational campaigns. The Kingdom of Saudi Arabia places a high premium on risk management for both the environment and safety. The government works to safeguard the welfare of its citizens, preserve the environment, and improve the standard of living in the nation through strict regulations, infrastructure investments, and sustainable development programs (Abubakar, 2021).

Environmental conservation is also a key focus for Saudi Arabia. The country is aware of the importance of preserving its unique ecosystems, such as the Red Sea coral reefs and the Arabian Peninsula's diverse wildlife. Efforts have been made to protect and rehabilitate these natural habitats, including the establishment of protected areas and the implementation of sustainable practices in sectors like agriculture and energy.

In terms of air and water quality, Saudi Arabia has taken steps to reduce pollution levels. The country has invested in renewable energy sources, such as solar and wind power, to decrease its reliance on fossil fuels and decrease greenhouse gas emissions. Additionally, wastewater treatment plants and desalination facilities have been developed to ensure the availability of clean water resources.

To enhance safety and environmental awareness, Saudi Arabia has also invested in education and public awareness campaigns. These initiatives aim to educate individuals about the importance of responsible environmental practices, such as waste management, conservation, and sustainable resource utilization. Furthermore, Saudi Arabia actively participates in international collaborations and agreements to address global environmental challenges. The country has been involved in discussions on climate change mitigation and has taken steps to align its policies with international standards and commitments.

Overall, managing safety and environmental risks is a priority for the Kingdom of Saudi Arabia. Through regulatory frameworks, sustainable practices, public awareness campaigns, and international collaborations, the country strives to ensure a high quality of life for its residents while preserving its natural resources for future generations.

Part: Two

2. Second part: the theoretical framework of the study

In the context of managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia, a theoretical framework can provide a structured approach for understanding and addressing these challenges. Here is an example of a theoretical framework that can be applied to this topic:

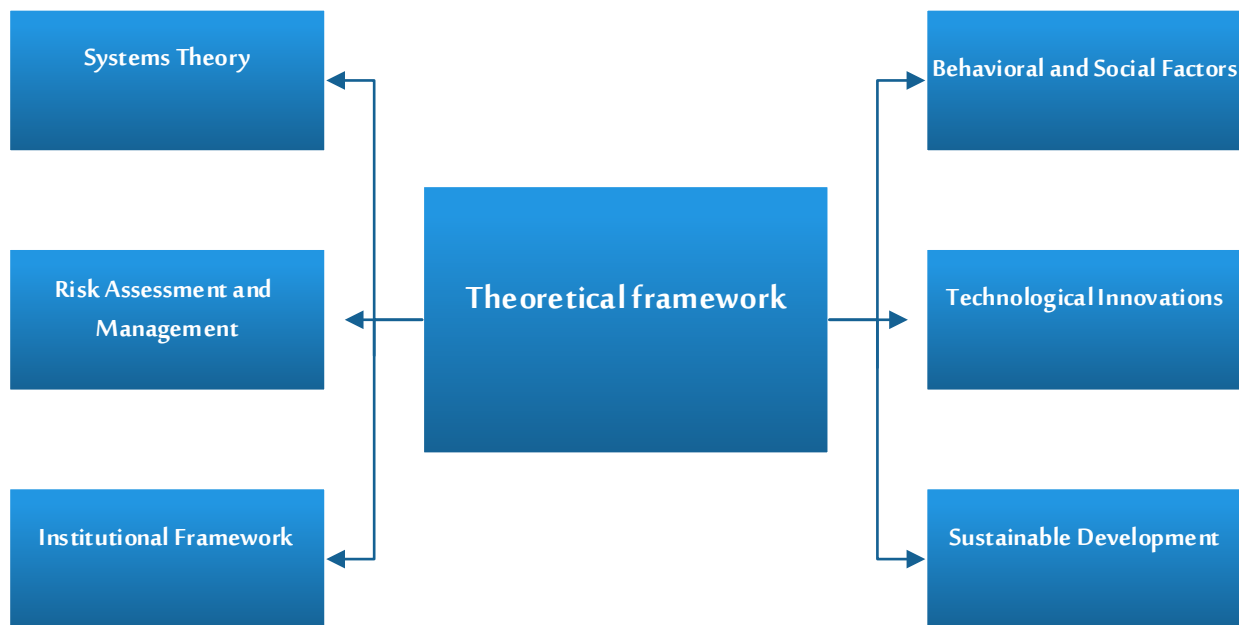


Figure 1: Theoretical framework.

1. **Systems Theory:** Systems theory can be used to understand the interdependencies and interactions between various components of the safety and environmental management system in Saudi Arabia. It emphasizes viewing the system as a whole and recognizing the relationships and feedback loops between different elements, such as government regulations, industrial practices, public awareness, and technological advancements.

Systems theory is a conceptual framework that helps us understand and manage complex systems by examining the interactions and interdependencies between various components within the system.

When applied to managing safety and environmental risks in the quality of life in the Kingdom of

Saudi Arabia, systems theory provides a holistic approach to identify, analyze, and address these risks.

In the context of safety and environmental risks, the Kingdom of Saudi Arabia faces various challenges such as industrial accidents, natural disasters, pollution, and resource depletion. These risks can have significant impacts on the well-being and quality of life of its citizens. Systems theory emphasizes the interconnectedness of different elements within a system and recognizes that changes in one part of the system can have ripple effects on other parts.

Applying systems theory to managing safety and environmental risks involves several key principles:

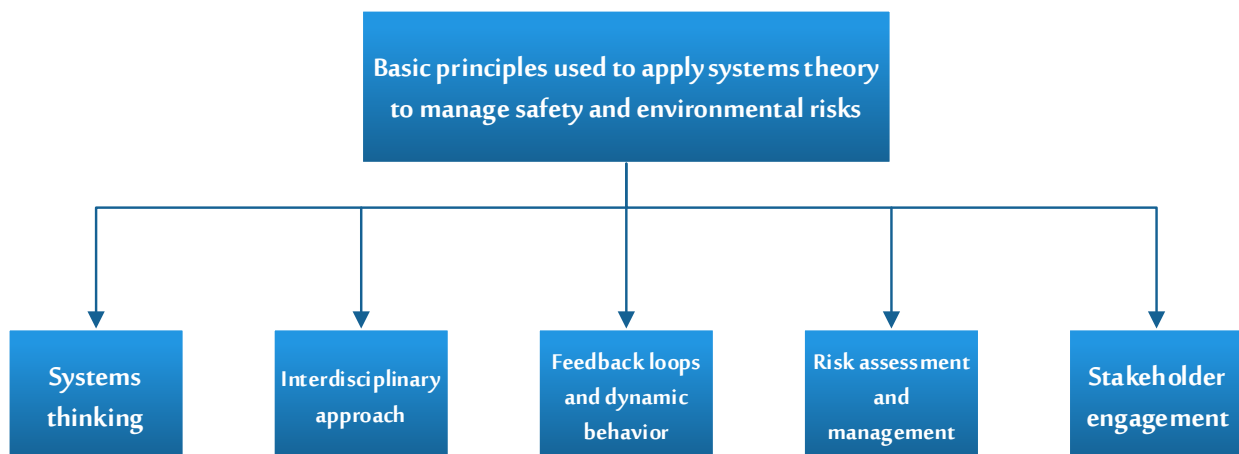


Figure 2: Basic principles used to apply systems theory to manage safety and environmental risks.

- **Systems thinking:** Systems theory encourages a comprehensive understanding of the entire system, including its components, relationships, and feedback loops. It recognizes that safety and environmental risks are often interconnected and that addressing one risk may have unintended consequences on other aspects. For example, implementing stricter regulations on industrial emissions may lead to increased costs for businesses, potentially impacting economic growth.

- **Interdisciplinary approach:** Systems theory recognizes that managing safety and environmental risks requires collaboration across different disciplines and sectors. It involves bringing together experts from various fields such as engineering, environmental science, public health, policy-making, and social sciences to develop comprehensive solutions. This interdisciplinary approach ensures a more holistic understanding of the risks and enables the development of effective strategies.
- **Feedback loops and dynamic behavior:** Systems theory acknowledges that systems are dynamic and constantly evolving. It emphasizes the importance of feedback loops, where the outputs of a system influence its future behavior. Understanding these feedback loops is crucial for managing safety and environmental risks. For example, monitoring air quality and promptly addressing pollution sources can help prevent adverse health effects and mitigate long-term environmental damage.
- **Risk assessment and management:** Systems theory emphasizes the need for systematic risk assessment and management. This involves identifying potential risks, evaluating their likelihood and potential impacts, and implementing appropriate measures to mitigate or prevent them. Risk management strategies may include implementing safety protocols, improving infrastructure resilience, promoting sustainable practices, and enhancing emergency response capabilities.
- **Stakeholder engagement:** Systems theory recognizes the importance of involving stakeholders in decision-making processes. This includes engaging with government agencies, industry representatives, communities, and individuals affected by safety and environmental risks. By including diverse perspectives, systems theory enables the development of more inclusive and effective risk management strategies.

By applying systems theory to managing safety and environmental risks in the Kingdom of Saudi Arabia, policymakers, experts, and stakeholders can gain a deeper understanding of the complex interactions and interdependencies within the system. This understanding can inform the development of more robust and sustainable strategies to enhance safety, protect the environment, and improve the overall quality of life for the people of Saudi Arabia.

2. **Risk Assessment and Management:** This framework involves identifying and assessing safety and environmental risks in Saudi Arabia, both at the macro and micro levels. It includes techniques such as hazard identification, risk analysis, risk evaluation, and risk treatment. Risk management strategies can be developed based on the assessment outcomes, considering factors like probability, severity, and acceptability of risks.

Risk assessment and management is a systematic process used to identify, evaluate, and address safety and environmental risks in order to protect the quality of life in the Kingdom of Saudi Arabia. It involves identifying potential hazards, assessing their likelihood and potential impacts, and implementing measures to mitigate or prevent those risks.

In the context of managing safety and environmental risks, risk assessment and management in Saudi Arabia typically involves the following steps:

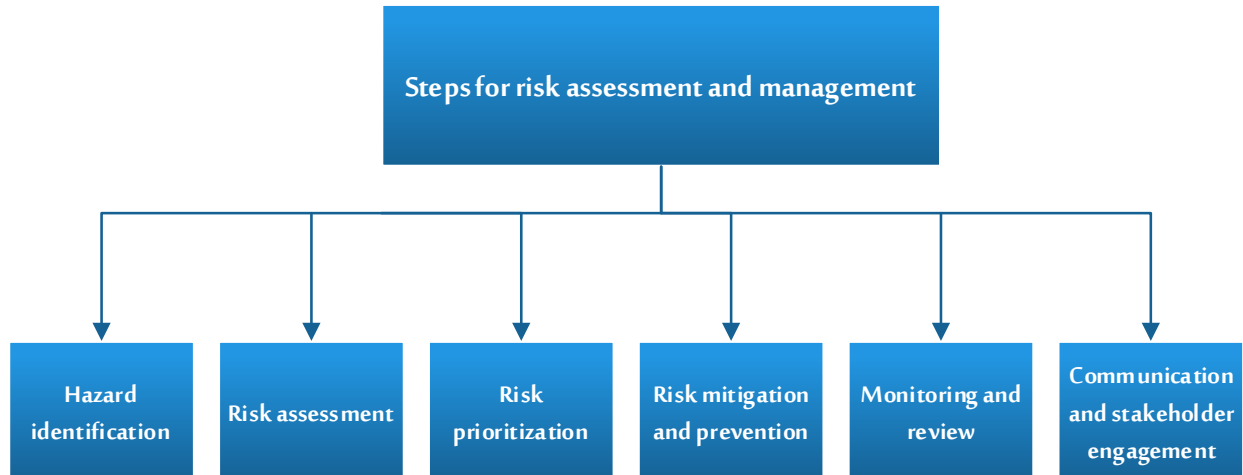


Figure 3: Steps for risk assessment and management.

- **Hazard identification:** The first step is to identify potential hazards that could pose risks to safety and the environment. This includes identifying natural hazards such as earthquakes, floods, and sandstorms, as well as human-made hazards like industrial accidents, pollution sources, and infrastructure vulnerabilities.
- **Risk assessment:** Once hazards are identified, a risk assessment is conducted to evaluate the likelihood and potential consequences of those hazards. This involves analyzing factors such as the probability of an event occurring, the severity of its impacts, and the vulnerability of the affected population or environment. Risk assessment methods may include quantitative analysis, qualitative analysis, or a combination of both.
- **Risk prioritization:** After assessing the risks, they are prioritized based on their significance and potential impacts. Risks with higher likelihood and severe consequences are given higher priority for further management actions. This helps allocate resources and attention to the most critical risks.
- **Risk mitigation and prevention:** Risk management strategies are then developed and implemented to mitigate or prevent identified risks. This may involve a combination of engineering controls,

administrative measures, and policy interventions. For example, safety regulations can be implemented to reduce the likelihood of industrial accidents, and pollution control measures can be enforced to minimize environmental contamination.

- **Monitoring and review:** Risk management is an ongoing process, and it is important to continuously monitor and review the effectiveness of implemented measures. This includes monitoring changes in risk levels, evaluating the performance of risk mitigation strategies, and making necessary adjustments or improvements as needed. Regular reviews ensure that risk management efforts remain up to date and effective.
- **Communication and stakeholder engagement:** Effective risk assessment and management involve transparent communication with stakeholders, including government agencies, industry representatives, communities, and individuals affected by the risks. Engaging stakeholders in the process helps ensure that their concerns and perspectives are considered, and it fosters a collaborative approach to managing risks.

By implementing robust risk assessment and management practices, Saudi Arabia can proactively identify and address safety and environmental risks. This helps safeguard the well-being and quality of life of its citizens, protect the environment, and promote sustainable development.

3. **Institutional Framework:** This component focuses on the institutional structures and governance mechanisms in place to manage safety and environmental risks. It includes analyzing the roles and responsibilities of different stakeholders, such as government agencies, regulatory bodies, industries, non-governmental organizations, and the public. The framework explores the effectiveness of

existing policies, regulations, enforcement mechanisms, and coordination mechanisms among stakeholders.

In the context of managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia, the term "institutional framework" refers to the system of laws, regulations, policies, and organizations that are in place to address and mitigate safety and environmental risks. It encompasses the structures and mechanisms that govern how these risks are identified, assessed, managed, and monitored within the country.

The institutional framework plays a crucial role in ensuring the protection of public health, safety, and the environment. It provides a framework for establishing standards, guidelines, and procedures to prevent and mitigate risks associated with various activities, such as industrial operations, transportation, construction, and waste management.

In Saudi Arabia, the institutional framework for managing safety and environmental risks is primarily governed by the government agencies responsible for overseeing these areas. The key institutions involved include:

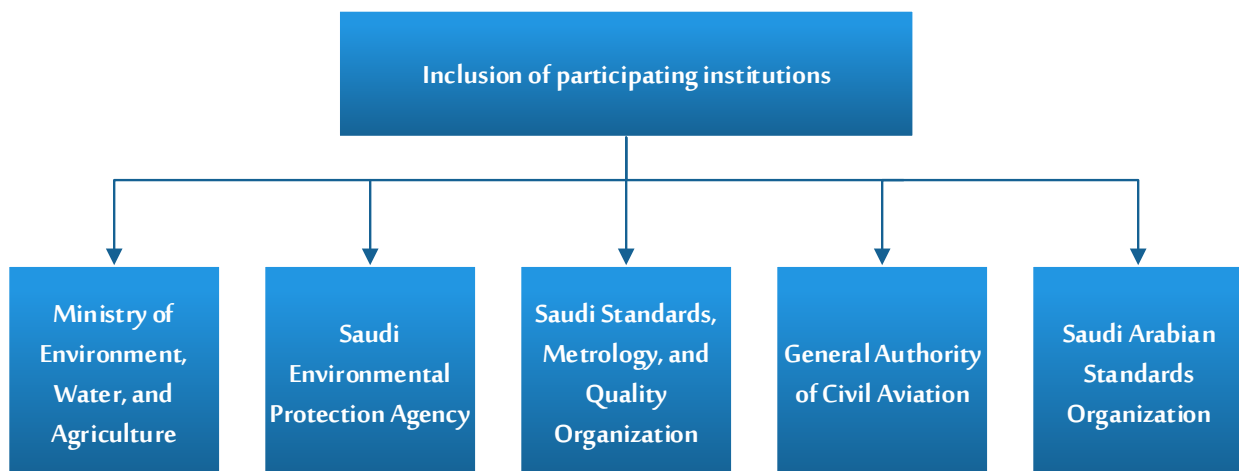


Figure 4: Inclusion of participating institutions.

- **Ministry of Environment, Water, and Agriculture:** Ministry of Environment, Water, and Agriculture is responsible for formulating and implementing environmental policies and regulations. It oversees environmental impact assessments, pollution control, and conservation efforts.
- **Saudi Environmental Protection Agency:** Saudi Environmental Protection Agency is a regulatory body that enforces environmental laws and regulations. It conducts inspections, issues permit, and takes enforcement actions against violators.
- **Saudi Standards, Metrology, and Quality Organization:** Saudi Standards, Metrology, and Quality Organization is responsible for setting standards and regulations for various products and services, including safety standards. It ensures that products and services meet the required safety and quality standards.
- **General Authority of Civil Aviation:** General Authority of Civil Aviation oversees aviation safety and security in Saudi Arabia. It regulates airports, airlines, and air traffic control to ensure compliance with international safety standards.
- **Saudi Arabian Standards Organization:** Saudi Arabian Standards Organization develops and promotes national standards for various sectors, including safety standards for consumer products, electrical appliances, and construction materials.

These institutions work together to establish regulations, conduct inspections, monitor compliance, and enforce penalties for non-compliance. They also collaborate with other government agencies, industry stakeholders, and the public to raise awareness, promote best practices, and ensure the effective management of safety and environmental risks.

In addition to government institutions, the institutional framework may also involve non-governmental organizations, industry associations, and research institutions that contribute to research, advocacy, and capacity-building efforts related to safety and environmental risks.

Overall, the institutional framework in Saudi Arabia provides the necessary structure and mechanisms to manage safety and environmental risks, safeguard public health and the environment, and promote sustainable development in the country.

4. **Behavioral and Social Factors:** This aspect recognizes the influence of human behavior and social factors on safety and environmental risks. It involves studying the attitudes, beliefs, and behaviors of individuals, communities, and organizations towards safety and environmental regulations. Factors such as awareness, education, social norms, cultural values, and incentives can shape behaviors related to risk management and compliance.

Managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia involves considering various factors, including behavioral and social factors. These factors play a crucial role in shaping the overall safety and environmental conditions in the country. Here's an explanation of behavioral and social factors in the context of managing safety and environmental risks in Saudi Arabia:

a) Behavioral Factors:

Behavioral factors refer to the actions, attitudes, and habits of individuals and communities that influence safety and environmental risks. In Saudi Arabia, promoting positive behaviors is essential for mitigating risks and ensuring a high quality of life. Some key behavioral factors include:

- i. **Compliance with Safety Regulations:** Encouraging individuals and organizations to comply with safety regulations is crucial. This involves following traffic rules, wearing personal protective

equipment in hazardous environments, and adhering to safety protocols in industries and workplaces.

- ii. **Responsible Waste Management:** Promoting responsible waste management practices is vital for environmental sustainability. This includes proper waste disposal, recycling, and reducing waste generation. Encouraging individuals to adopt eco-friendly habits, such as reducing plastic usage and conserving resources, can significantly impact environmental risks.
- iii. **Fire Safety Awareness:** Raising awareness about fire safety measures is important in Saudi Arabia, given the country's climate and the presence of flammable materials. Educating individuals about fire prevention, safe handling of flammable substances, and the importance of early detection and evacuation can help minimize fire-related risks.

b) Social Factors:

Social factors encompass the broader societal aspects that influence safety and environmental risks.

These factors involve the collective actions, norms, and values of the society. In Saudi Arabia, several social factors contribute to managing safety and environmental risks, including:

- i. **Education and Awareness:** Promoting education and awareness campaigns is crucial for enhancing safety and environmental consciousness. Educating the population about the risks associated with unsafe practices, pollution, and environmental degradation can lead to positive behavioral changes and a greater emphasis on safety.
- ii. **Community Engagement:** Engaging communities in safety and environmental initiatives fosters a sense of responsibility and ownership. Encouraging community participation in activities such as neighborhood clean-ups, tree planting, and safety awareness programs can create a collective effort towards risk reduction.

- iii. **Government Policies and Regulations:** The Saudi Arabian government plays a significant role in managing safety and environmental risks through the formulation and enforcement of policies and regulations. These policies may include setting safety standards, implementing environmental protection measures, and monitoring compliance across various sectors.
- iv. **Social Support Systems:** Establishing social support systems, such as emergency response services, healthcare facilities, and counseling programs, contributes to managing safety risks effectively. These systems provide assistance during emergencies and ensure the well-being of individuals and communities.

In summary, managing safety and environmental risks in the Kingdom of Saudi Arabia requires considering behavioral and social factors. Encouraging positive behaviors, promoting awareness, engaging communities, implementing effective policies, and establishing support systems are all essential components of ensuring a high quality of life while mitigating safety and environmental risks.

- 5. **Technological Innovations:** This framework acknowledges the role of technological advancements in managing safety and environmental risks. It examines the potential of emerging technologies, such as artificial intelligence, Internet of Things, remote sensing, and data analytics, in improving risk assessment, monitoring, and response capabilities. It also considers the challenges and ethical implications associated with the adoption of new technologies.

Technological innovations play a crucial role in managing safety and environmental risks, contributing to the overall quality of life in the Kingdom of Saudi Arabia. These innovations encompass a wide range of advancements in various sectors, including energy, transportation, waste

management, and monitoring systems. Here are some key technological innovations that are helping to address safety and environmental risks in Saudi Arabia:

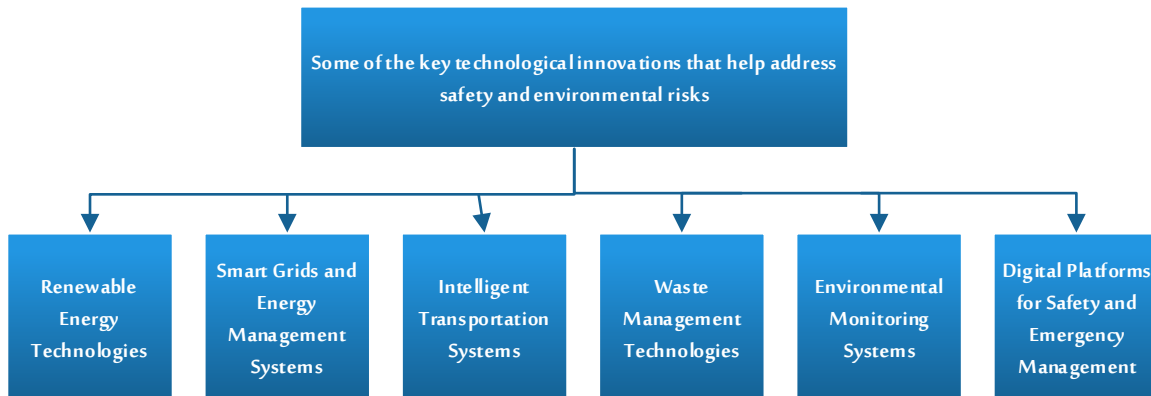


Figure 5: Some of the key technological innovations that help address safety and environmental risks.

- **Renewable Energy Technologies:** Saudi Arabia has been actively investing in renewable energy sources, such as solar and wind power, to reduce its reliance on fossil fuels and mitigate environmental risks associated with carbon emissions. The country has implemented large-scale solar projects, including the development of solar farms and the installation of solar panels on rooftops. These initiatives not only promote clean energy but also contribute to reducing air pollution and improving the overall environmental quality.
- **Smart Grids and Energy Management Systems:** The implementation of smart grids and advanced energy management systems enables efficient monitoring, control, and optimization of energy distribution. These technologies facilitate the integration of renewable energy sources into the existing power grid, ensuring a stable and reliable energy supply. By improving energy efficiency and reducing wastage, smart grids help to minimize environmental impacts and enhance the safety and reliability of the energy infrastructure.

- **Intelligent Transportation Systems:** Saudi Arabia is investing in intelligent transportation systems to enhance road safety and reduce traffic congestion. in intelligent transportation systems technologies include real-time traffic monitoring, smart traffic signal control, and advanced driver assistance systems. These innovations improve the efficiency of transportation networks, reduce accidents, and minimize environmental pollution by optimizing traffic flow and promoting the use of public transportation.
- **Waste Management Technologies:** Effective waste management is crucial for minimizing environmental risks and ensuring a high quality of life. Saudi Arabia has been adopting innovative waste management technologies, such as waste-to-energy plants, recycling facilities, and smart waste collection systems. These technologies help in reducing landfill waste, promoting recycling, and generating clean energy from waste materials, thereby mitigating environmental pollution and enhancing sustainability.
- **Environmental Monitoring Systems:** To safeguard the environment and public health, Saudi Arabia is investing in advanced environmental monitoring systems. These systems employ sensors, satellite imagery, and data analytics to monitor air quality, water quality, and other environmental parameters. By providing real-time data and early warning systems, these technologies enable prompt responses to environmental risks, helping to protect ecosystems, mitigate pollution, and ensure a safe living environment.
- **Digital Platforms for Safety and Emergency Management:** Digital platforms and mobile applications are being utilized to enhance safety and emergency management in Saudi Arabia. These platforms provide citizens with access to emergency services, facilitate reporting of safety incidents, and enable real-time communication during emergencies. By leveraging technology, these platforms

improve response times, enhance coordination among relevant authorities, and contribute to the overall safety and well-being of the population.

In summary, technological innovations in Saudi Arabia are playing a vital role in managing safety and environmental risks, thereby improving the quality of life. These innovations encompass renewable energy technologies, smart grids, intelligent transportation systems, waste management technologies, environmental monitoring systems, and digital platforms for safety and emergency management. By embracing these advancements, Saudi Arabia is making significant strides towards a sustainable and safe future.

6. **Sustainable Development:** This component integrates the concept of sustainable development into the framework. It emphasizes the need to balance economic growth, social well-being, and environmental protection in Saudi Arabia. The framework explores how safety and environmental risks can be managed in a way that promotes sustainable development, including strategies such as pollution prevention, resource conservation, green technologies, and corporate social responsibility. Sustainable development refers to a holistic approach to development that aims to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. It involves integrating economic, social, and environmental considerations into decision-making processes to ensure long-term well-being and prosperity.

In the context of managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia, sustainable development plays a crucial role. Saudi Arabia, as a rapidly developing country, faces various challenges related to safety and environmental risks that can impact the quality of life of its residents. These risks can include industrial accidents, pollution, natural disasters, and other hazards.

To address these challenges, sustainable development principles can be applied in the following ways:

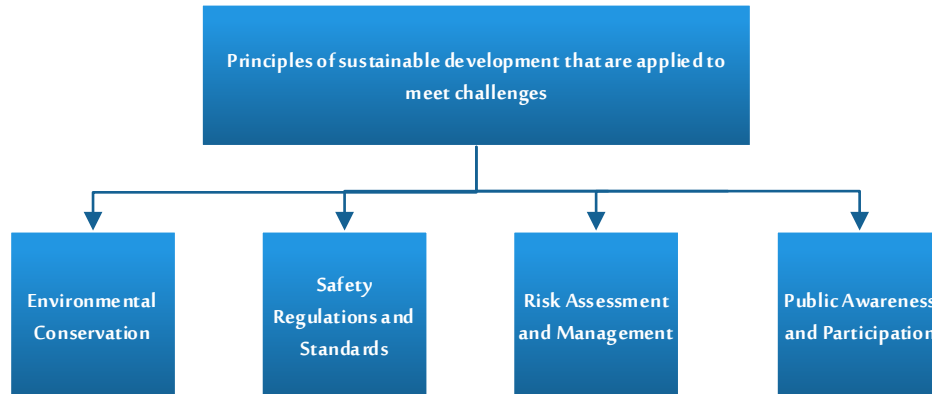


Figure 6: Principles of sustainable development that are applied to meet challenges.

- **Environmental Conservation:** Sustainable development emphasizes the conservation and preservation of the environment. In Saudi Arabia, this can involve implementing measures to reduce pollution, protect natural resources, and promote sustainable land and water management practices. For example, the country can invest in renewable energy sources, such as solar and wind power, to reduce its reliance on fossil fuels and mitigate environmental risks associated with their extraction and use.
- **Safety Regulations and Standards:** Sustainable development requires the establishment and enforcement of safety regulations and standards to protect human health and well-being. In Saudi Arabia, this can involve implementing robust safety measures in industries such as oil and gas, construction, and transportation to prevent accidents and minimize risks to workers and the public. It may also involve developing and enforcing building codes, fire safety regulations, and occupational health and safety standards.

- **Risk Assessment and Management:** Sustainable development involves conducting comprehensive risk assessments to identify potential hazards and develop strategies to manage and mitigate them. In Saudi Arabia, this can involve conducting environmental impact assessments for major development projects, implementing emergency response plans for natural disasters, and establishing monitoring systems to detect and respond to safety and environmental risks in a timely manner.
 - **Public Awareness and Participation:** Sustainable development emphasizes the importance of public awareness and participation in decision-making processes. In Saudi Arabia, this can involve raising awareness among the public about safety and environmental risks, promoting sustainable practices at the individual and community levels, and involving stakeholders in the development and implementation of policies and regulations related to safety and environmental protection.
- By integrating sustainable development principles into the management of safety and environmental risks, Saudi Arabia can strive to ensure a high quality of life for its residents while safeguarding the environment and promoting long-term sustainability. This approach can help create a safer, healthier, and more resilient society in the Kingdom.

2.1. First chapter: Problem of the study and its importance

The research challenge for this paper stems from the need to study the impact of visualization tools such as charts and charts on safety and environmental risk management in quality of life in the Kingdom of Saudi Arabia. While the use of graphical representations in time management has risen internationally, only a few studies have been conducted in Saudi Arabia to verify their usefulness regarding risk management and their impact on quality of life and environmental safety in Saudi Arabia.

The problem addressed in the study is the management of safety and environmental risks and their impact on the quality of life in the Kingdom of Saudi Arabia. The study aims to understand the current state of safety and environmental practices in the country and identify measures that can be taken to mitigate risks and improve the overall quality of life for residents.

The study may examine various safety risks prevalent in Saudi Arabia, such as workplace accidents, traffic accidents, and public safety concerns. It may investigate the causes and consequences of these risks and evaluate the existing safety measures in place.

The study may focus on environmental risks, including air pollution, water pollution, waste management, and the depletion of natural resources. It may assess the impact of these risks on the environment and the health and well-being of the population.

The study may analyze the relationship between safety, environmental risks, and the overall quality of life in Saudi Arabia. It may explore factors such as access to healthcare, educational opportunities, social infrastructure, and recreational facilities, and how safety and environmental risks influence these factors.

The study may examine the existing regulatory framework and policies related to safety and environmental protection in Saudi Arabia. It may evaluate the effectiveness of these regulations and identify potential gaps or areas for improvement.

Based on the findings, the study may provide recommendations for managing safety and environmental risks more effectively. It may suggest best practices, policy interventions, and strategies to enhance safety standards, promote sustainable development, and improve the overall quality of life in the Kingdom.

The most important environmental issues Saudi Arabia is dealing with are tainted well water, waste from cement plants, higher emissions of sulfur dioxide and nitrogen oxide, desertification and land degradation, and other issues that could lead to more pollution and environmental hazards. Continuous population growth, fast urbanization, rising energy and water consumption, and the demands of economic development all contribute to these problems.

2.1.1. The importance of studying

The study on managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia is significant for several reasons:

1. **Human Safety:** Ensuring the safety of individuals is paramount for any society. By studying and addressing safety risks, the study can contribute to reducing accidents, injuries, and fatalities in various domains such as workplaces, roads, and public spaces. This, in turn, enhances the overall well-being and quality of life for residents in Saudi Arabia.

Managing safety and environmental risks is of paramount importance for ensuring the quality of life in the Kingdom of Saudi Arabia. The well-being and safety of the population are crucial factors that contribute to a thriving society and sustainable development. This is particularly relevant in Saudi Arabia, given its rapid economic growth, industrialization, and urbanization.

First and foremost, prioritizing human safety is essential for protecting the lives and health of individuals. By effectively managing safety risks, the occurrence of accidents, injuries, and fatalities can be minimized. This includes implementing robust safety measures in various sectors such as

construction, transportation, manufacturing, and energy. By doing so, the Kingdom can create a safer environment for its citizens, residents, and visitors.

Furthermore, addressing environmental risks is vital for safeguarding the natural resources and ecosystems that support life. Saudi Arabia is known for its rich biodiversity, unique ecosystems, and valuable natural resources such as oil and gas. However, industrial activities, urban expansion, and pollution pose significant threats to the environment. By managing environmental risks, the Kingdom can mitigate pollution, protect ecosystems, and ensure the sustainability of its natural resources for future generations.

Managing safety and environmental risks also has economic implications. Accidents and environmental disasters can have severe economic consequences, including property damage, loss of productivity, and increased healthcare costs. By investing in safety and environmental management, Saudi Arabia can reduce the financial burden associated with accidents and environmental degradation. Moreover, a safe and clean environment enhances the country's attractiveness to investors, promotes sustainable economic growth, and supports the development of industries that prioritize safety and sustainability.

Additionally, managing safety and environmental risks contributes to social stability and public trust. When individuals feel safe in their daily lives, they are more likely to engage in social and economic activities, fostering a sense of well-being and community cohesion. Moreover, effective risk management demonstrates the government's commitment to protecting its citizens and the environment, which enhances public trust and confidence in the authorities.

In conclusion, managing safety and environmental risks is crucial for ensuring the quality of life in the Kingdom of Saudi Arabia. By prioritizing human safety, protecting the environment, and considering

the economic and social implications, the Kingdom can create a safer, more sustainable, and prosperous society. This requires a comprehensive approach that involves robust regulations, effective enforcement, public awareness campaigns, and collaboration between government, industries, and communities.

2. **Environmental Protection:** Saudi Arabia, like many other countries, faces environmental challenges such as air pollution, water contamination, and waste management issues. By examining environmental risks and proposing effective management strategies, the study can contribute to preserving and protecting the natural resources, biodiversity, and ecosystems in the country. This has long-term benefits for both the environment and the quality of life of its inhabitants.

Environmental protection plays a crucial role in managing safety and environmental risks and is of utmost importance for ensuring the quality of life in the Kingdom of Saudi Arabia. The Kingdom is known for its diverse ecosystems, rich biodiversity, and valuable natural resources, making it essential to prioritize environmental conservation and sustainability.

Firstly, managing safety and environmental risks is vital for protecting the natural environment and preserving its ecological balance. Saudi Arabia is home to unique ecosystems, including deserts, coastal areas, and marine environments. These ecosystems provide habitat for numerous plant and animal species, some of which are endemic and endangered. By effectively managing environmental risks, such as pollution, habitat destruction, and climate change impacts, the Kingdom can safeguard its natural heritage and ensure the long-term viability of its ecosystems.

Secondly, environmental protection is closely linked to public health. Pollution, whether it's air, water, or soil pollution, can have detrimental effects on human health. By managing environmental risks, Saudi Arabia can reduce the exposure of its population to harmful pollutants and contaminants.

This includes implementing measures to control industrial emissions, improving waste management practices, and promoting sustainable transportation options. Protecting the environment directly translates into protecting the health and well-being of the people living in the Kingdom.

Furthermore, environmental protection contributes to sustainable development and the conservation of natural resources. Saudi Arabia heavily relies on its oil and gas reserves for economic growth and development. However, the extraction and use of these resources can have significant environmental impacts, such as greenhouse gas emissions and habitat destruction. By managing environmental risks, the Kingdom can mitigate these impacts and promote sustainable practices, including renewable energy development, water conservation, and responsible resource extraction. This ensures the long-term availability of resources and supports a more sustainable and resilient economy.

Additionally, environmental protection is closely tied to climate change mitigation and adaptation. The Kingdom of Saudi Arabia, like many other countries, is vulnerable to the impacts of climate change, including rising temperatures, water scarcity, and extreme weather events. By managing environmental risks and reducing greenhouse gas emissions, the Kingdom can contribute to global efforts to combat climate change and protect its population from its adverse effects. This includes investing in renewable energy, promoting energy efficiency, and implementing climate adaptation strategies.

Lastly, environmental protection enhances the overall quality of life for the people of Saudi Arabia. A clean and healthy environment provides numerous benefits, including improved air and water quality, access to green spaces, and opportunities for outdoor recreation. These factors contribute to

the physical and mental well-being of individuals, fostering a higher quality of life and a sense of connection to the natural world.

In conclusion, environmental protection is of utmost importance for managing safety and environmental risks and ensuring the quality of life in the Kingdom of Saudi Arabia. By prioritizing environmental conservation, the Kingdom can protect its unique ecosystems, safeguard public health, promote sustainable development, mitigate climate change, and enhance the overall well-being of its population. This requires a comprehensive approach that involves strong environmental regulations, effective enforcement, public awareness, and collaboration between government, industries, and communities.

3. **Health and Well-being:** Safety and environmental risks have a direct impact on the health and well-being of individuals. Addressing these risks can help prevent or reduce the occurrence of diseases, respiratory problems, and other health issues associated with exposure to hazardous environments. By improving safety practices and environmental conditions, the study can enhance the overall health outcomes and quality of life for the Saudi population.

The study on managing safety and environmental risks in the Kingdom of Saudi Arabia is crucial for promoting health and well-being among its population. The health and well-being of individuals are fundamental aspects of a high-quality life, and addressing safety and environmental risks directly impacts these factors in several ways.

Firstly, managing safety risks is essential for protecting the physical health and safety of the population. By implementing effective safety measures in various sectors such as construction, transportation, and manufacturing, the occurrence of accidents, injuries, and fatalities can be minimized. This includes ensuring proper workplace safety protocols, safe transportation systems,

and secure infrastructure. By reducing the risk of accidents and injuries, the study contributes to the overall health and well-being of individuals in the Kingdom.

Secondly, addressing environmental risks is crucial for safeguarding public health. Environmental factors such as air pollution, water contamination, and exposure to hazardous substances can have detrimental effects on human health. By managing environmental risks, the study aims to mitigate these hazards and protect the population from the adverse health impacts associated with pollution and environmental degradation. This includes implementing measures to control pollution sources, improving waste management practices, and promoting sustainable development to reduce environmental risks.

Furthermore, managing safety and environmental risks contributes to mental well-being. Living in a safe and clean environment can positively impact mental health by reducing stress, anxiety, and fear associated with safety concerns. When individuals feel secure in their surroundings, they are more likely to experience improved mental well-being, leading to a higher quality of life. By addressing safety and environmental risks, the study aims to create a conducive environment for promoting mental well-being among the population.

Moreover, the study's focus on managing safety and environmental risks aligns with the concept of social well-being. When individuals feel safe and protected in their communities, it fosters a sense of belonging, trust, and social cohesion. By addressing safety risks and promoting environmental protection, the study contributes to creating a supportive and inclusive social environment, enhancing the overall well-being of individuals and communities in the Kingdom.

Additionally, managing safety and environmental risks has economic implications for health and well-being. Accidents, injuries, and environmental disasters can have significant economic costs,

including healthcare expenses, loss of productivity, and property damage. By investing in safety and environmental management, the study aims to reduce the economic burden associated with these risks, thus contributing to the overall economic well-being of the Kingdom.

In conclusion, the study on managing safety and environmental risks in the Kingdom of Saudi Arabia is crucial for promoting health and well-being among its population. By addressing safety risks, mitigating environmental hazards, and creating a supportive social and economic environment, the study aims to enhance the overall quality of life for individuals in the Kingdom. This requires a comprehensive approach that involves effective regulations, enforcement, public awareness, and collaboration between various stakeholders to ensure the health and well-being of the population are prioritized.

4. **Sustainable Development:** Managing safety and environmental risks is vital for achieving sustainable development goals. By promoting sustainable practices and reducing risks, the study can contribute to a more sustainable and resilient society in Saudi Arabia. This includes the responsible use of resources, the reduction of carbon emissions, and the adoption of eco-friendly technologies, leading to a more sustainable future for the country.

Sustainable development refers to the practice of meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. It involves finding a balance between economic growth, social development, and environmental protection. Managing safety and environmental risks is a crucial aspect of sustainable development, particularly in the context of the quality of life in the Kingdom of Saudi Arabia.

The Kingdom of Saudi Arabia has experienced significant economic growth and development over the years, driven primarily by its vast reserves of oil and natural gas. However, this rapid

development has also brought about various safety and environmental risks that need to be effectively managed to ensure the well-being of its citizens and the preservation of its natural resources.

One of the key reasons for studying and managing safety and environmental risks in Saudi Arabia is to protect the health and safety of its population. Industrial activities, such as oil and gas extraction, petrochemical production, and construction, can pose significant risks to human health and safety if not properly managed. By studying these risks and implementing appropriate safety measures, the government and relevant stakeholders can minimize accidents, occupational hazards, and other health risks, thereby safeguarding the well-being of the people.

Furthermore, managing safety and environmental risks is essential for preserving the natural environment in Saudi Arabia. The country is home to diverse ecosystems, including deserts, coastal areas, and marine environments, which are rich in biodiversity. Irresponsible industrial practices and inadequate environmental regulations can lead to pollution, habitat destruction, and the depletion of natural resources. By studying and managing these risks, Saudi Arabia can ensure the sustainable use of its natural resources, protect its unique ecosystems, and mitigate the impact of human activities on the environment.

In addition to protecting human health and the environment, managing safety and environmental risks also contributes to the overall quality of life in Saudi Arabia. A clean and safe environment enhances the well-being and livability of communities. It promotes tourism, attracts investment, and improves the overall image of the country. By prioritizing safety and environmental considerations, Saudi Arabia can create a more sustainable and resilient society, where people can thrive and enjoy a high quality of life.

Moreover, addressing safety and environmental risks aligns with global sustainability goals and commitments. Saudi Arabia is a signatory to international agreements, such as the United Nations Sustainable Development Goals (SDGs) and the Paris Agreement on climate change. By studying and managing safety and environmental risks, the Kingdom can demonstrate its commitment to these global initiatives, contribute to global efforts in combating climate change, and position itself as a responsible and sustainable nation on the international stage.

In conclusion, studying and managing safety and environmental risks in the Kingdom of Saudi Arabia is of paramount importance for sustainable development and the quality of life. By effectively addressing these risks, the country can protect human health, preserve its natural environment, enhance the well-being of its citizens, and fulfill its global commitments. It requires a collaborative effort between the government, industries, communities, and individuals to ensure a safe, sustainable, and prosperous future for Saudi Arabia.

5. **Policy and Decision-making:** The findings and recommendations of the study can serve as valuable inputs for policymakers and decision-makers in Saudi Arabia. It can help in formulating and implementing effective regulations, policies, and interventions to manage safety and environmental risks. Evidence-based decision-making can lead to improved safety standards, better environmental protection measures, and the overall enhancement of the quality of life for the Saudi population.

The study of managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia is crucial for informing policy and decision-making processes. Policy and decision-makers play a vital role in shaping the regulations, strategies, and actions that govern safety and environmental practices in the country. Here are some key reasons why this study is important in the context of policy and decision-making:

- **Risk assessment and mitigation:** The study provides valuable insights into the specific safety and environmental risks faced by Saudi Arabia. It helps policy and decision-makers understand the potential hazards associated with various industries and activities, such as oil and gas extraction, petrochemical production, and construction. By identifying and assessing these risks, policymakers can develop targeted regulations and mitigation measures to minimize the likelihood and impact of accidents, pollution, and other adverse events.
- **Evidence-based policymaking:** The study provides scientific evidence and data on safety and environmental risks, which is essential for making informed policy decisions. It helps policymakers understand the magnitude of the risks, their potential consequences, and the effectiveness of different risk management strategies. By relying on empirical evidence, policymakers can develop policies and regulations that are grounded in scientific knowledge, increasing the likelihood of achieving desired outcomes and protecting the well-being of the population.
- **Balancing economic development and sustainability:** Saudi Arabia has been striving to diversify its economy and reduce its dependence on oil. However, this transition must be carried out in a sustainable manner that considers safety and environmental risks. The study helps policymakers strike a balance between economic development and sustainability by providing insights into the potential trade-offs and synergies between different objectives. It enables policymakers to develop strategies that promote economic growth while minimizing negative impacts on safety and the environment.
- **Stakeholder engagement and participation:** Managing safety and environmental risks requires the involvement of various stakeholders, including government agencies, industries, communities, and civil society organizations. The study helps policymakers engage with these stakeholders by

providing a common understanding of the risks and their implications. It facilitates dialogue, collaboration, and participation in decision-making processes, ensuring that diverse perspectives and expertise are considered. By involving stakeholders, policymakers can develop more inclusive and effective policies that address the concerns and priorities of different groups.

- **International cooperation and alignment:** Safety and environmental risks are global challenges that require international cooperation and alignment. The study helps policymakers understand the international best practices, standards, and commitments related to safety and environmental management. It enables them to align Saudi Arabia's policies and regulations with international frameworks, such as the United Nations Sustainable Development Goals and global climate agreements. This alignment enhances the country's reputation, facilitates international collaboration, and promotes the exchange of knowledge and experiences with other nations facing similar challenges.

In summary, the study of managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia is essential for policy and decision-making. It provides valuable insights, evidence, and stakeholder engagement opportunities that inform the development of effective regulations, strategies, and actions. By incorporating scientific knowledge and considering the perspectives of various stakeholders, policymakers can ensure that safety and environmental risks are adequately managed, contributing to a sustainable and high-quality of life for the people of Saudi Arabia.

In summary, the study on managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia is important as it contributes to human safety, environmental protection, health and well-being,

sustainable development, and informed policy-making. It has the potential to create positive impacts on multiple aspects of Saudi society, leading to a safer, healthier, and more sustainable future for its residents.

2.2. Second chapter: First variable of the study

The first variable in the study of managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia could be "Industrial Practices and Processes".

Industrial practices and processes refer to the methods, technologies, and procedures employed by industries in Saudi Arabia, particularly those that have the potential to generate safety and environmental risks. This variable focuses on understanding and assessing the practices and processes used in various sectors, such as oil and gas extraction, petrochemical production, construction, and manufacturing.

Exploring this variable involves examining the specific activities and operations carried out within these industries, including the handling and storage of hazardous materials, waste management practices, emissions control measures, and workplace safety protocols. It aims to identify potential sources of risks and vulnerabilities that may impact the safety of workers, communities, and the environment.

By studying industrial practices and processes, researchers can evaluate the adequacy of existing safety and environmental regulations, identify gaps or areas for improvement, and propose strategies to mitigate risks. This variable also involves analyzing the effectiveness of technologies and innovations in reducing safety and environmental hazards, such as the implementation of advanced monitoring systems, process automation, and the adoption of cleaner production methods.

Furthermore, understanding industrial practices and processes is crucial for assessing the impact of economic activities on the quality of life in Saudi Arabia. It helps researchers and policymakers evaluate the trade-offs between economic development and environmental sustainability, as well as identify opportunities for promoting sustainable practices within industries. This variable also considers the potential social and economic consequences of safety incidents and environmental damage, such as impacts on public health, livelihoods, and the overall well-being of communities.

Overall, the variable of industrial practices and processes provides insights into the specific activities and operations that contribute to safety and environmental risks in Saudi Arabia. It serves as a foundation for developing targeted interventions, regulations, and policies to manage and mitigate these risks, ultimately enhancing the quality of life for the people of Saudi Arabia.

2.3. Third chapter: Second variable and the correlation between variables

The second variable in the study of managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia could be "Regulatory Framework and Compliance".

The regulatory framework and compliance variable focuses on the laws, regulations, policies, and standards that govern safety and environmental practices in Saudi Arabia. It examines the legal and institutional framework established by the government to ensure the protection of human health, safety, and the environment.

This variable involves analyzing the existing regulatory framework related to safety and environmental risks, including laws and regulations specific to industries such as oil and gas, petrochemicals,

construction, and waste management. It also considers broader environmental legislation, such as air quality standards, water management regulations, and waste disposal guidelines.

Researchers studying this variable assess the effectiveness of the regulatory framework in addressing safety and environmental risks. They examine the clarity, consistency, and enforceability of regulations, as well as the capacity and resources of regulatory agencies responsible for monitoring and enforcing compliance. This includes evaluating the adequacy of penalties and incentives to encourage compliance with safety and environmental standards.

Furthermore, the variable of regulatory framework and compliance explores the level of compliance with safety and environmental regulations by industries and other stakeholders. It examines the extent to which companies adhere to the prescribed standards and practices, including the implementation of safety protocols, environmental management systems, and reporting requirements. Researchers may also assess the effectiveness of monitoring and inspection mechanisms in ensuring compliance.

By studying the regulatory framework and compliance, researchers and policymakers can identify gaps, weaknesses, or areas for improvement in the existing system. They can propose reforms, updates, or new regulations to enhance safety and environmental protection. Additionally, this variable helps in evaluating the capacity-building needs of regulatory agencies and promoting a culture of compliance among industries through awareness campaigns, training programs, and incentives.

Overall, the variable of regulatory framework and compliance provides insights into the legal and institutional mechanisms governing safety and environmental risks in Saudi Arabia. It helps in assessing the effectiveness of regulations, identifying areas for improvement, and promoting compliance to ensure the well-being of the population and the preservation of the environment.

2.3.1. Correlation between Variables

The correlation between the first variable of the study, industrial practices, and processes, and the second variable, regulatory framework and compliance, is essential in effectively managing safety and environmental risks and ensuring a high quality of life in the Kingdom of Saudi Arabia. The relationship between these variables can be understood through the following aspects:

- **Risk identification and mitigation:** Industrial practices and processes provide valuable insights into the potential safety and environmental risks associated with various economic activities. By studying these practices, researchers can identify specific hazards, vulnerabilities, and potential sources of risks. This information is crucial for developing appropriate regulations and compliance measures within the regulatory framework to mitigate these risks effectively.
- **Regulatory effectiveness:** The regulatory framework establishes the standards, guidelines, and requirements that industries must comply with to ensure safety and environmental protection. The study of industrial practices and processes helps assess the effectiveness of the regulatory framework in achieving its intended goals. By examining compliance levels and identifying areas of non-compliance or gaps in the regulations, policymakers can make informed decisions to improve and strengthen the regulatory framework.
- **Continuous improvement:** The correlation between industrial practices and processes and the regulatory framework is iterative and dynamic. As new technologies, practices, and innovations emerge within industries, they may introduce new risks or opportunities for improvement. The study of industrial practices provides feedback to regulatory agencies, enabling them to update and adapt

regulations to address emerging risks and promote continuous improvement in safety and environmental management.

- **Compliance and enforcement:** The regulatory framework sets the standards and requirements for industries to follow, ensuring compliance with safety and environmental regulations. The study of industrial practices and processes helps assess the level of compliance within industries. By identifying areas of non-compliance or weaknesses in compliance, policymakers can focus enforcement efforts, allocate resources effectively, and develop strategies to encourage greater compliance and adherence to regulations.
- **Stakeholder engagement:** The correlation between these variables necessitates collaboration and engagement between industry stakeholders and regulatory agencies. The study of industrial practices and processes provides an opportunity for dialogue and collaboration between researchers, industry representatives, and regulatory authorities. This collaboration helps in understanding industry perspectives, challenges, and needs, leading to the development of regulations that are practical, feasible, and effective in managing safety and environmental risks.

In summary, the correlation between industrial practices and processes and the regulatory framework and compliance is crucial for safety and environmental risk management in Saudi Arabia. By understanding and addressing the risks associated with industrial practices, policymakers can develop and enforce regulations that effectively mitigate these risks. This correlation promotes continuous improvement, enhances compliance, and fosters collaboration between industry stakeholders and regulatory agencies, ultimately contributing to a higher quality of life for the people of Saudi Arabia.

2.4. Previous studies

The state has encouraged extensive use of motorized vehicles. Saudi Arabia, the world's most urbanized nation, recently unveiled Saudi Vision 2030. Eight out of ten Saudi Arabians are said to reside in urban areas. The country of Arabia seeks to transform from traditional cities into an environmentally sustainable nation through population growth, industrialization, urbanization, fuel abundance, and climate change. A variety of initiatives pertaining to intelligent, sustainable, and digital development have been put forth in an effort to support this new phase of growth and prosperity. One way to solve these issues is to shift toward greener products and things. Green mobility is now essential in places like Saudi Arabia. Put another way, the nation is heading toward using green components to solve the aforementioned problems. In Saudi Arabia, the industrial sector currently requires green mobility. In order to reduce or even completely eradicate the mobility issues related to air pollution, the nation must carry out significant operations (Heliyon, 2023).

The increased use of groundwater resources around the world has led to both an increase in contamination and a decline in water quality. In the Kingdom of Saudi Arabia (KSA), one of the most significant sources of water supply for irrigation and drinking is groundwater. Groundwater extraction in the Kingdom of Saudi Arabia has escalated over the last thirty years, amounting to 17 billion m³/year. In Saudi Arabia, groundwater supplies 80% of the demand for water. When contrasted with the rate of withdrawal, the net annual recharge of groundwater is extremely low. The quality of the groundwater is also impacted by the dropping levels. Overlying the fractured Precambrian basement, a significant source of groundwater in the area, are the deep aquifers in the sedimentary formations of the Arabian shield. These formations are made up of a thick sequence of Paleozoic to recent sedimentary succession. These aquifers have developed secondary porosities (Mallick, 2021).

Since the National Committee on Quality Assurance in primary healthcare services was established in the 1990s, the Saudi Ministry of Health (MOH) has been involved in quality improvement. The King Abdul-Aziz Quality Award was established in 1999 as a result of these efforts and a national push to raise awareness of quality. This award was intended to motivate both the public and private sectors to provide high-quality services, including healthcare. Medical errors, lengthy wait times, and poor service quality are just a few of the issues facing Saudi Arabia's healthcare system, despite the country's strong government commitment to raising the standard of care. In light of these pressing issues, the healthcare system performs below par even with enormous financial investments (Alasmari, 2021).

Environmental challenges have become increasingly significant worldwide, with organizations concerned about conducting business environmentally responsibly. While commitment to the natural environment has become critical today, the maritime transport and logistics business has received less attention from stakeholders than the sustainability concerns of aviation and overland freight industries. Although sea transport has fewer environmental impacts than other modes of transportation per kilometer driven, this is still a significant issue when considering the global nature of international trade (Alzahrani, 2022).

The Competent Agency will be notified through regional and international organizations, programs, and agencies of any environmental pollution resulting from sources outside Saudi Arabia's borders and territorial waters. The Responsible Agency will carry out the necessary air, land, and marine monitoring, observation, and follow-up, as well as implement the national contingency plans for the abatement of pollution and take the necessary actions (elaw, 2001).

2.5. Research objectives

1. **Assess Current Safety and Environmental Risks:** The study aims to evaluate the existing safety and environmental risks prevalent in different sectors of Saudi Arabian society. This involves identifying and analyzing risks related to workplaces, transportation, public spaces, air and water quality, waste management, and other relevant areas.
2. **Understand the Impact on Quality of Life:** The study seeks to understand how safety and environmental risks affect the overall quality of life in Saudi Arabia. This includes examining the social, economic, and health implications of these risks on individuals and communities. By quantifying and qualitatively assessing the impact, the study can provide a comprehensive understanding of the relationship between risks and quality of life.
3. **Identify Gaps in Safety and Environmental Practices:** The study aims to identify gaps and deficiencies in the current safety and environmental practices in Saudi Arabia. This involves analyzing existing regulations, policies, and enforcement mechanisms to determine their effectiveness and identify areas for improvement. By identifying gaps, the study can provide insights into areas where interventions are needed to enhance safety and environmental management.
4. **Propose Strategies for Risk Mitigation:** Based on the findings, the study aims to propose strategies and recommendations for effectively managing safety and environmental risks. This may include suggesting policy interventions, regulatory frameworks, technological advancements, and best practices to mitigate risks and enhance safety measures. The objective is to provide actionable insights that can guide decision-makers in implementing effective risk management strategies.
5. **Promote Sustainable Development:** The study aims to promote sustainable development by integrating safety and environmental considerations into various sectors. This involves exploring

opportunities for sustainable practices, such as renewable energy, waste reduction, and resource conservation. By highlighting the benefits of sustainable development, the study can contribute to a more balanced and environmentally conscious approach to managing risks.

6. **Enhance Stakeholder Awareness and Collaboration:** The study aims to raise awareness among stakeholders, including government agencies, industry, civil society organizations, and the public, about the importance of managing safety and environmental risks. It seeks to foster collaboration and partnerships among stakeholders to collectively work towards improving safety standards and environmental sustainability.

Overall, the objectives of the study revolve around assessing risks, understanding their impact on quality of life, identifying gaps, proposing mitigation strategies, promoting sustainable development, and enhancing stakeholder collaboration. By achieving these objectives, the study can contribute to creating a safer, healthier, and more sustainable living environment for the people of Saudi Arabia.

Part: Three

3. Third part: Practical study and its methodological procedures

The methodological procedures are referred to in the scientific research plan as the researcher's systematic method to study a specific problem. Aspects related to the study; also represent a brief presentation of the contents of the study. It is known that the data of the group, which were deduced from the quantitative research, are in the form of a numerical value, unlike the nature of the data collected from the qualitative research. A quantitative approach will be used in the data analysis process (khaled, 2022).

It is worth noting that scientific research methods mean the method followed by the researcher to obtain information related to a specific topic related to a specialization, and this method differs completely

from one researcher to another depending on the available material or intellectual capabilities, as well as with regard to the quality of the research.

To conduct a practical study on safety and environmental risk management in the quality of life in the Kingdom of Saudi Arabia, researchers can follow a systematic methodology that includes the following procedures:

- **Literature Review:** Begin by conducting a comprehensive review of existing literature related to safety and environmental risks in Saudi Arabia. This step helps researchers gain a thorough understanding of the current state of knowledge, identify gaps in research, and inform the development of research questions and objectives.
- **Research Design:** Determine the appropriate research design for the study, considering factors such as the scope, objectives, and available resources. For example, a mixed-methods approach combining quantitative and qualitative data collection methods may be suitable. Decide on the target population, sampling techniques, and data collection methods that align with the research objectives.
- **Data Collection:** Collect data on industrial practices, processes, regulatory frameworks, compliance, and their impact on safety and environmental risks. This can involve various methods, such as surveys, interviews, observations, and document analysis. Engage with relevant stakeholders, including industry representatives, regulatory authorities, and community members, to gather diverse perspectives and insights.
- **Data Analysis:** Analyze the collected data using appropriate analytical techniques. Quantitative data can be analyzed using statistical methods to identify patterns, correlations, and trends. Qualitative data can be subjected to thematic analysis or content analysis to identify key themes, perspectives,

and narratives. Triangulation of data from different sources and methods can enhance the robustness of the analysis.

- **Risk Assessment:** Conduct a comprehensive risk assessment based on the findings from the data analysis. Identify and evaluate specific safety and environmental risks associated with industrial practices and processes in Saudi Arabia. This can involve assessing the likelihood and severity of risks, considering factors such as potential hazards, exposure pathways, and vulnerability of affected populations.
- **Policy and Intervention Development:** Based on the risk assessment findings, develop policies, strategies, and interventions to manage and mitigate safety and environmental risks. This can include proposing updates to the regulatory framework, recommending best practices for industries, and suggesting measures to enhance compliance and enforcement. Consider the social, economic, and environmental implications of proposed interventions.
- **Evaluation and Monitoring:** Implement and evaluate the effectiveness of the proposed policies and interventions. Monitor the implementation process, assess the outcomes, and measure the impact on safety and environmental risk reduction. This step helps in refining and improving the strategies over time and ensuring their alignment with the goal of enhancing the quality of life in Saudi Arabia.
- **Reporting and Dissemination:** Prepare a comprehensive report summarizing the study's findings, methodologies, and recommendations. Disseminate the findings through academic publications, conferences, workshops, and engagement with relevant stakeholders. Sharing the research outcomes contributes to knowledge dissemination, policy dialogue, and potential implementation of the proposed interventions.

3.1. Fourth chapter: Methodological procedures

Contrary to the nature of the data collected from qualitative research, the data collected and deduced from quantitative research are in the form of numerical values, and due to this difference, both research differ from each other in a number of tools and methods used to collect data. In this research, the quantitative approach will be relied upon in data analysis, where quantitative research can be defined as a systematic study based on collecting quantifiable data through specialized tools such as opinion polls and questionnaires, or by processing data that has already been counted using computational techniques. Various programs such as Excel, SPSS and other programs that are used in data analysis (Ho, 2018).

a) Questionnaire method

The method of implementing the questionnaires will be highlighted as the method that will be used to collect data in this research, as the questionnaires still play a pivotal role in collecting quantitative data to this day, as they help simplify and measure the answers and the data collected, and they are characterized by legitimacy and privacy to the answers Respondents, questionnaires are further classified into several classes as two main types of questionnaires can be used: sectional questionnaires and longitudinal questionnaires. A cross-sectional questionnaire provides an assessment of similar characteristics and differences between several samples of data, done simultaneously. Longitudinal scanning involves looking at a single data cluster over different times. This requires administering questionnaires at several points in time describing change, stability, or trends over a specified period.

b) Using SPSS in data analysis

Statistical Package for the Social Sciences or SPSS is a program used for deep search and analysis of complex quantitative data. It is one of the most useful programs for organizations and businessmen as well as

scientists and researchers in a huge collection of data and information for better analysis and evaluation, so it will be relied upon to analyze the data for this research.

It is possible to conclude that SPSS is a high-quality software package used for interactive or pooled statistical analysis, which is useful for analyzing and collecting data and information. Researchers can also organize data through SPSS data analysis software and perform functions within SPSS such as MANOVA testing in addition to regression analysis so that the relationship between the data its direction is clear, as it can be effectively identified. Most major research agencies around the world use SPSS to analyze data so that they can get the most out of their research and investigative projects.

c) Advantages of data analysis with the help of SPSS software

SPSS data analysis appears in the small amount of effort that the researcher needs to use this program. The primary functions of SPSS are statistics programming, model programming, and text analysis for questionnaire programs. Through these functions, data analysis can be carried out in a systematic process. Through SPSS it will be possible to critically analyze the relationship and interdependence between variables within the framework of data sets and develop an in-depth critical assessment, which will contribute to improving the quality of this research.

Collecting information and data in scientific research

The process of collecting information and data in this scientific research on the impact of safety and environmental risk management on the quality of life in the Kingdom of Saudi Arabia is carried out by collecting reliable information from its various sources and analyzing it objectively by the researcher. And specific scientific methods to ensure its validity and make the necessary

amendments to it, whether by addition or deletion. The objectives of the study revolve around assessing risks, understanding their impact on quality of life, identifying gaps, proposing mitigation strategies, promoting sustainable development, and enhancing stakeholder collaboration. By achieving these objectives, the study can contribute to creating a safer, healthier, and more sustainable living environment for the people of Saudi Arabia. Scientific research is the only way through which understanding, and awareness can be built based on scientific evidence that aims to reach knowledge in various aspects revolving around the impact of safety and environmental risk management (khaled, 2022).

It is known that the scientific researcher must collect accurate data and information when going to study a specific issue or problem whose goal is to explain and analyze the nature of the event or how to manage safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia, which is what this research encourages. Because the tools used in questionnaires, tests, observations, and interviews vary depending on the type and subject of the scientific study, it is possible to combine more than one tool in the same research. The questionnaire method was applied in this research. One of the most important goals is collecting data and information that can be included in statistical analysis processes. Defining study procedures helps organize the components of the problem and serves as a constant touchstone for the researcher in all study processes. One of the advantages that notification provides to the discussant is the feeling of the researcher's experience and competence in his specialty.

In this research on the impact of safety and environmental risk management on quality of life in the Kingdom of Saudi Arabia, the methodological procedures of the study can be referred to. In other words, they are perceptions about research implementation provided by a set of rules agreed upon among research

experts. Scientific research methods mean the method followed by the researcher in detailing a specific issue related to the specialty, and this approach varies greatly among researchers according to the available material or intellectual factors, as well as the degree of scientific research, in scientific research methods. Questionnaires will be used as an effective tool in measuring groups. This research contains a wide range of diverse data on the impact of safety and environmental risk management on the quality of life in the Kingdom of Saudi Arabia.

The reference here in this research to the impact of safety and environmental risk management on the quality of life in the Kingdom of Saudi Arabia indicates that one of the advantages of the questionnaire method is that it is a non-cumbersome and effective method in terms of time and cost compared to the questionnaire method. Questionnaire method. Other search methods. Questionnaire methods are widely used in research on the impact of safety and environmental risk management on quality of life in the Kingdom of Saudi Arabia by using standardized questionnaires to systematically collect data about the target group throughout the scope of the research.

It is known that the data of the group, which were deduced from the quantitative research, are in the form of a numerical value, unlike the nature of the data collected from the qualitative research. The efficiency of global supply chains a quantitative approach will be used in the data analysis process (khaled, 2022).

In this research on the impact of safety and environmental risk management on the quality of life in the Kingdom of Saudi Arabia, the definition of quantitative research can be formulated as a systematic study that relies on a data collection process that accepts quantitative measurement by relying on specific tools such as opinion polls. Or questionnaires or data processing that has already been carried out. They were

previously counted using multiple computational techniques, such as SPSS, or what is known as the Statistical Package for the Social Sciences.

Since the questionnaire is one of the main tools used in scientific research, the scientific researcher, when conducting a study of a phenomenon or problem, collects the necessary information and data about that problem or phenomenon to clarify and examine the reason for the issue or sensations that the researcher reveals via his investigation. Tests, examinations, and interviews are among the methods utilized in that questionnaire, and the techniques employed vary according to the content of the scientific study material. Questionnaires play an influential role in collecting quantitative data as they contribute to simplifying and measuring the data and answers collected.

In this research on the impact of safety and environmental risk management on the quality of life in the Kingdom of Saudi Arabia, the quantitative approach will be relied upon in data analysis, as quantitative research can be defined as a systematic study that relies on collecting measurable data through specific tools such as opinion polls, questionnaires, or... While processing the data that has already been calculated using various computational techniques such as SPSS (Rahman, 2020).

When conducting this research to explore the impact of safety and environmental risk management on quality of life in the Kingdom of Saudi Arabia, the Statistical Package for the Social Sciences or SPSS was used. It is a program used for deep research and analysis of complex data. It is beneficial for sectors, businessmen as well as scholars to search a wide range of data and information for better analysis and evaluation. Most major research organizations use SPSS to analyze drilling and text data to increase the effectiveness of their exploration and investigation projects. It is a statistical analysis software package for

collaboration or batch scientific calculations. IBM SPSS Statistics is the trade name of the current version of the software.

(Robert, 2017) found that the help of SPSS is useful for data analysts to take advantage of various data sets and conduct various statistical analyses such as ANOVA, T-test, or MANOVA, as well as regression analysis, to examine varied data and correlate the link between the independent and dependent variables, and then, using SPSS analysis, to SPSS will allow you to critically assess the interaction and relationship between elements within the context of data sets and build an in-depth critical analysis. Assessment, which will contribute to improving the quality of this research and the ease of analyzing the results collected from the questionnaire that was previously prepared according to the study questions.

(Hinton and Isabella, 2017) clarified that the positives of data processing with SPSS data analysis include that the researcher does not need to put in much effort to utilize this software, and the effort spent on data analysis with SPSS is substantially less than any other research instrument, which is advantageous for researchers to perform an analysis. In-depth evaluation of SPSS's core functions includes statistical development, model scripting, and information extraction for questionnaires programmers, which are accomplished by properly embedding massive volumes of statistical data and information.

In this research, the questionnaire method will be used to collect the necessary data on the impact of safety and environmental risk management on the quality of life in the Kingdom of Saudi Arabia. Therefore, the researcher asks these questions to a group of individuals and calls them the study sample. The primary goal behind this is to collect data and information so that it can be studied to reach accurate results related to the study problem. The questionnaire is considered one of the main tools used in scientific research, as the scientific researcher, when studying a phenomenon or problem, collects the necessary information and data

about that problem or phenomenon to clarify and analyze the nature of the problem or phenomenon he is searching for, which the researcher presents through the research he presents.

The tools used in that questionnaire, tests, observations, and interviews, and the tools used vary according to the nature of the scientific research material. Questionnaires play an influential role in collecting quantitative data, as they contribute to simplifying and measuring the collected data and answers. Survey research collects information from a sample of individuals through their answers to specific questions. This form of study provides a range of ways to attract people, collect data, and ask questions. It is known that the data collected through quantitative research methods are numerical values, unlike the nature of the data collected from qualitative research. Quantitative research can be defined as a systematic study based on the data collection process that accepts quantitative measurement. Quantitative data analysis is a systematic process for collecting and evaluating measurable data and checking them out.

3.2. Fifth chapter: Field results

3.2.1. Credibility and reliability of data

Cronbach's alpha is a measure of a survey's internal consistency or reliability. Use this statistic to assess whether a group of items consistently measures the same feature. Cronbach's alpha measures the degree of agreement on a standardized scale ranging from 0 to 1. Higher values imply more excellent agreement among items. High Cronbach's alpha values suggest that each participant's response values are consistent throughout a set of questions. When participants provide a high answer to one item, they are more likely to respond highly to another. This consistency shows that the measurements are accurate and that the objects may be measuring the same.

Low values, on the other hand, suggest that the group of items does not dependably measure the same construct. High responses to a single question do not imply that participants scored the other items highly. As a result, the questions are unlikely to measure the same attribute because the measurements are inaccurate. Data for this statistic is often derived from survey responses, assessment instruments, and test results. Data can be continuous. However, it is most commonly represented by Likert and binary values. Calculations are based on the assumption that all items measure the same feature on the same scale. This is referred to as the analogous tau model by statisticians (Taber, 2017).

Accordingly, the value of Cronbach's Alpha equals .653, which is considered more significant than 0.5. This indicates the reliability and accuracy of the data we obtained.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.653	.654	20

Table 1: Cronbach's Alpha analysis

Summary Item Statistics							
	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Variances	1.823	.312	2.406	2.094	7.716	.226	20

Table 2: Summary Item Statistics

3.2.2. Statistical description

Descriptive statistics are concise, informative characteristics summarizing a given data set, which can be a whole population representation or a subset. Measurements of central tendency and variance (spread)

are two types of descriptive statistics. The mean, median, and mode are examples of measurements of central tendency, whereas standard deviation, variance, minimum and maximum variables, kurtosis, and skewness are examples of measures of variation.

Raw data may contain inaccuracies and unstructured information, making it difficult to express. It might not be easy to make any inferences from such data. Descriptive statistics is a method for condensing, clarifying, and reusing difficult-to-understand information from a vast data collection into a model from which insights may be extracted quickly. Several statistical analysis approaches are available to help you obtain reliable data-driven conclusions. However, descriptive statistical analysis makes your data catalog simpler to comprehend, utilize, and portray in whatever format. You risk distorting the original data or omitting key features while describing, summarizing, and illustrating many observations. Sometimes, more than one data collecting point and a summary indication are required. In such circumstances, descriptive statistics aid in distilling enormous volumes of data into a more concise summary, typically by presenting more than one indication in a comprehensible format (HAYES, 2023).

In this research, questionnaire questions were created, placed on Google Forms, and distributed to concerned persons, those working in ministries and governments, and those affected by environmental problems. Within 20 days, 230 responses were collected from the respondents in the experiment, and using the SPSS program with the statistical package, we will analyze the data and display it graphically and pictorially.

- **The age**

By researching the importance of the ages of the participants, the older the participants in the experiment, the greater their scientific experience and the stronger the data. We have variation and harmony in the ages of the

participants in the experiment, which gives us diversity in the answers, and this enables us to generalize the results of the experiment due to the randomness of the data.

The Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	1.3	1.3	1.3
	20-30	71	30.9	30.9	32.2
	30-40	43	18.7	18.7	50.9
	40-50	48	20.9	20.9	71.7
	50-60	36	15.7	15.7	87.4
	60+	29	12.6	12.6	100.0
	Total	230	100.0	100.0	

Table 3: Age descriptive statistics

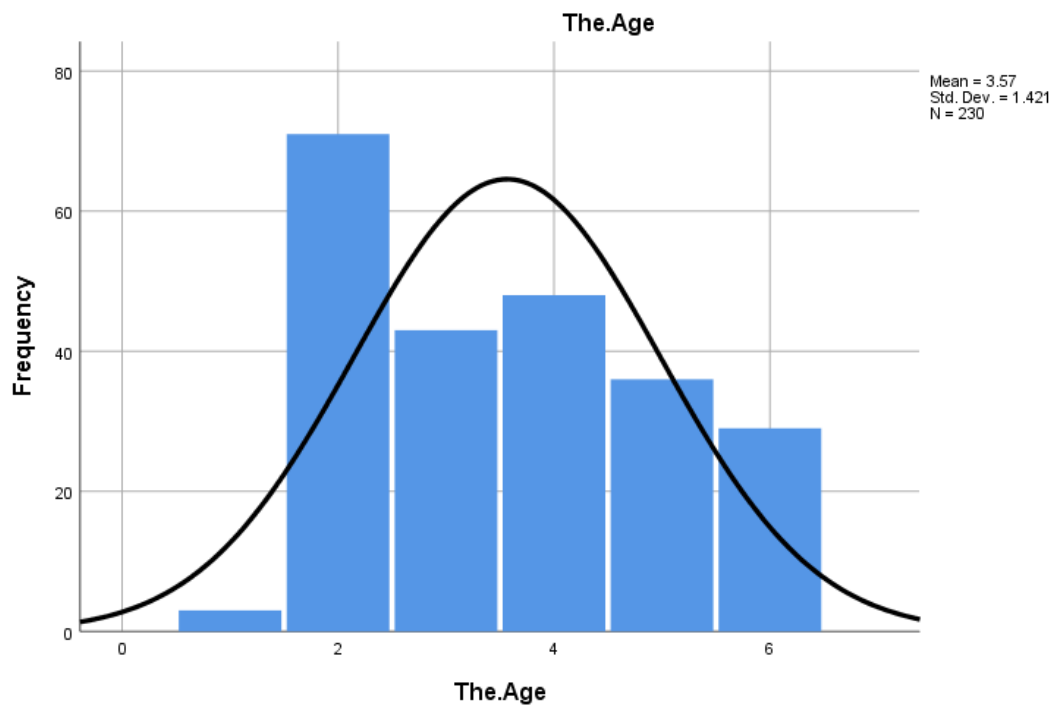


Figure 7: Age descriptive statistics.

- **Participant sex**

It is clear to us that a percentage of respondents in the experiment did not say their gender. This may be to preserve their confidentiality; their percentage was 3.5%. As for the rest of the males and females, there was diversity and harmony between genders.

Participant sex					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	8	3.5	3.5	3.5
	Female	121	52.6	52.6	56.1
	Male	101	43.9	43.9	100.0
	Total	230	100.0	100.0	

Table 4: Gender descriptive statistics

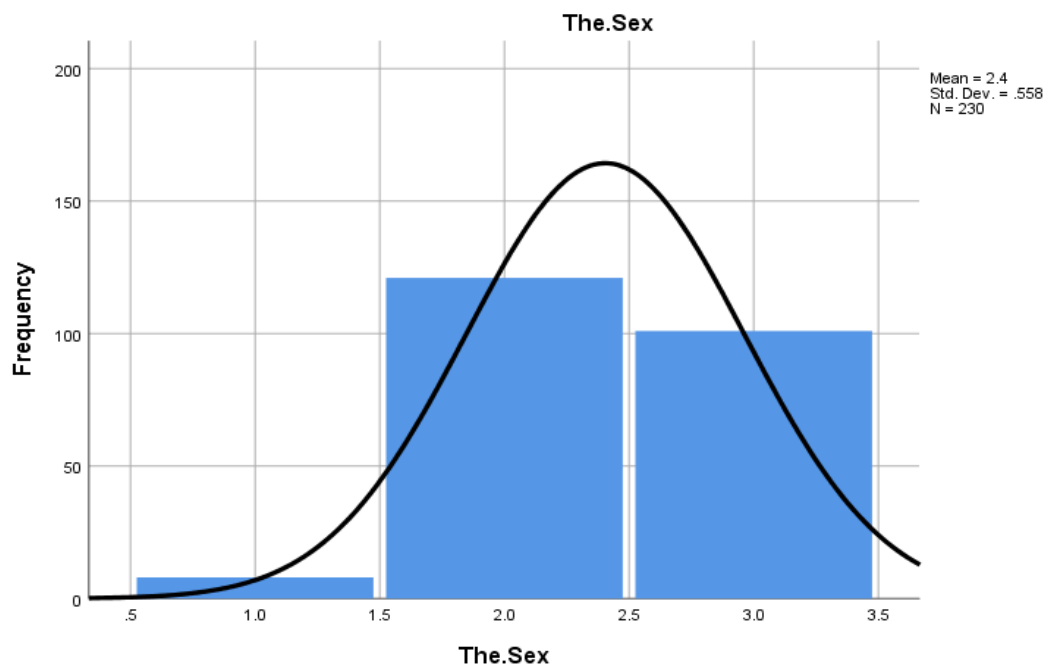


Figure 8: Gender descriptive statistics.

- **The highest educational degree**

The statistical description of the highest academic degree reached by respondents in the experiment can describe the accuracy of the data regarding the academic degrees, experience, and diligence they have achieved over the years. There was consistency in the academic degrees reached by the respondents in the experiment, and this could give us diversity in the answers, analysis, and connections.

The highest educational degree					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	2.2	2.2	2.2
	Bachelors degree	50	21.7	21.7	23.9
	Highschool Diploma	41	17.8	17.8	41.7
	Masters	40	17.4	17.4	59.1
	PhD	37	16.1	16.1	75.2
	Post Graduate degree	57	24.8	24.8	100.0
	Total	230	100.0	100.0	

Table 5: Statistical description of the highest educational degree

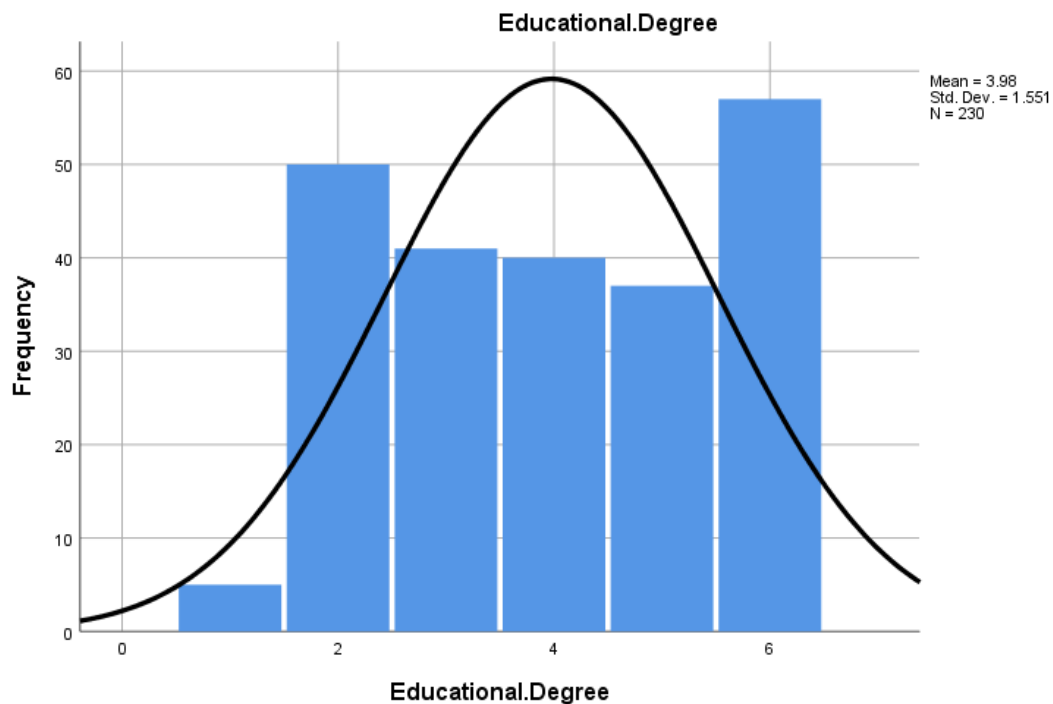


Figure 9: Statistical description of the highest educational degree.

- **Are you aware of the safety regulations and guidelines implemented by the government in Saudi Arabia?**

We had to initially ask the respondents in the experiment whether they were aware of the safety regulations and guidelines implemented by the government in the Kingdom of Saudi Arabia to measure their awareness and knowledge of the guidelines and regulations and how to comply with the laws. The most significant percentage of them was aware of the guidelines, regulations, and laws, and their percentage was 42.2%. In comparison, the other percentage was 24.8%, and they knew some of the laws and guidelines regarding health and safety. In the end, a large percentage of the experiment participants are very knowledgeable about health and safety guidelines in the Kingdom of Saudi Arabia.

Are you aware of the safety regulations and guidelines implemented by the government in Saudi Arabia?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	2.6	2.6	2.6
	Maybe	57	24.8	24.8	27.4
	No	70	30.4	30.4	57.8
	Yes	97	42.2	42.2	100.0
	Total	230	100.0	100.0	

Table 6: Regulations descriptive statistics

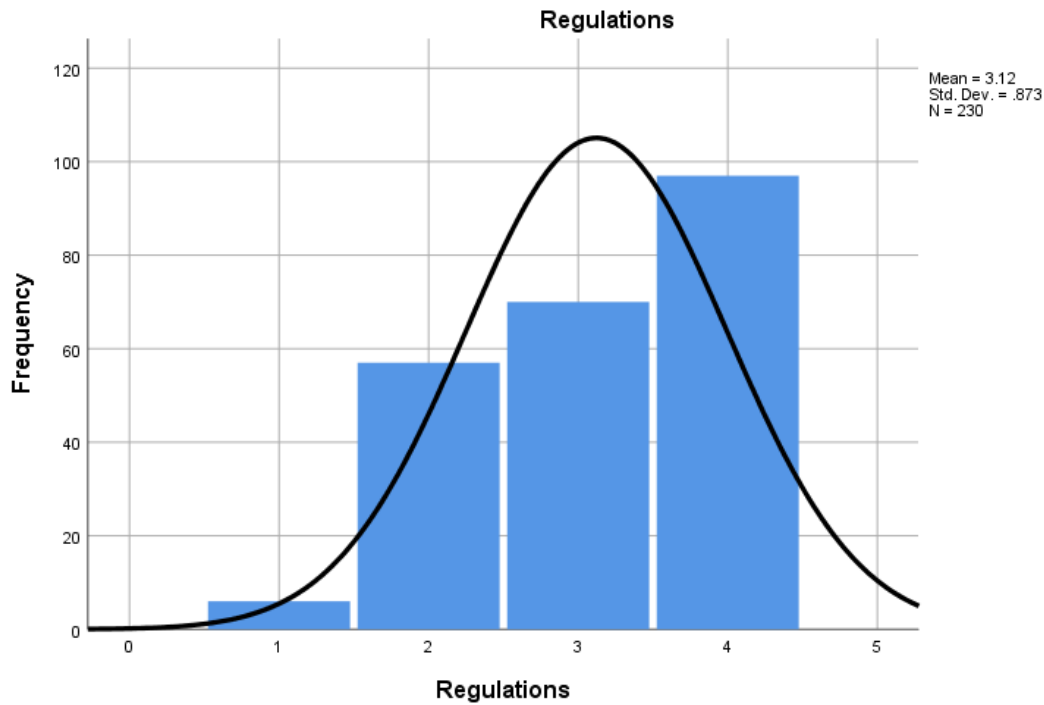


Figure 10: Regulations descriptive statistic.

- **Do you think the government of Saudi Arabia is effectively addressing safety and environmental risks in the country?**

By looking at the Kingdom's Vision 2030 and the tremendous efforts and contributions made to the Queen, the Kingdom strives to address environmental risks and move towards sustainability. Through this, we see that the approval rate is equal to 24.8%, and the Strongly agreed rate is equal to 22.6%, which confirms their knowledge and awareness of the tremendous efforts made by the Kingdom of Saudi Arabia.

Do you think the government of Saudi Arabia is effectively addressing safety and environmental risks in the country?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	1.3	1.3	1.3
	Agree	57	24.8	24.8	26.1
	Disagree	31	13.5	13.5	39.6
	Neither agree nor	70	30.4	30.4	70.0

	disagree				
	Strongly agree	52	22.6	22.6	92.6
	Strongly disagree	17	7.4	7.4	100.0
	Total	230	100.0	100.0	

Table 7: Descriptive statistics to address risks related to safety and the environment

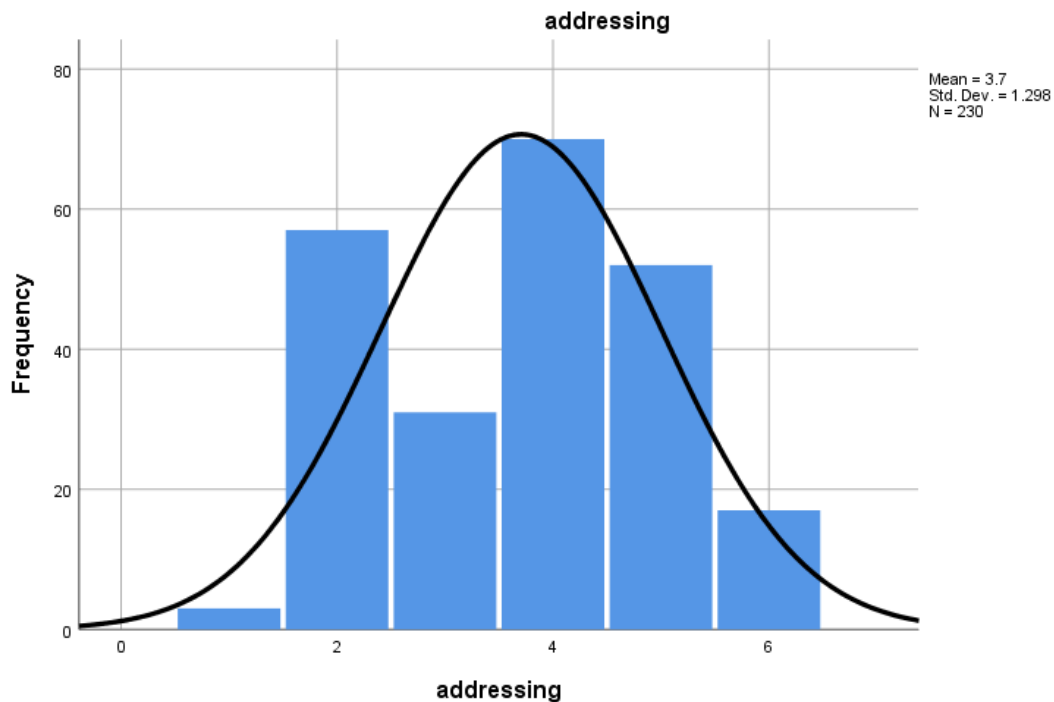


Figure 11: Descriptive statistics to address risks related to safety and the environment.

- **Have you personally observed any instances where safety and environmental risks were not adequately managed in Saudi Arabia?**

Indeed, there are human errors and no 100% correction, and there are some errors and problems that a person may neglect to address. There was consistency in the percentages we obtained from respondents in the experiment about cases needing treatment or noticing.

Have you personally observed any instances where safety and environmental risks were

not adequately managed in Saudi Arabia?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	1.7	1.7	1.7
	Agree	49	21.3	21.3	23.0
	Disagree	38	16.5	16.5	39.6
	Neither agree nor disagree	50	21.7	21.7	61.3
	Strongly agree	72	31.3	31.3	92.6
	Strongly disagree	17	7.4	7.4	100.0
	Total	230	100.0	100.0	

Table 8: Descriptive statistics for cases where safety and environmental risks were not appropriately addressed

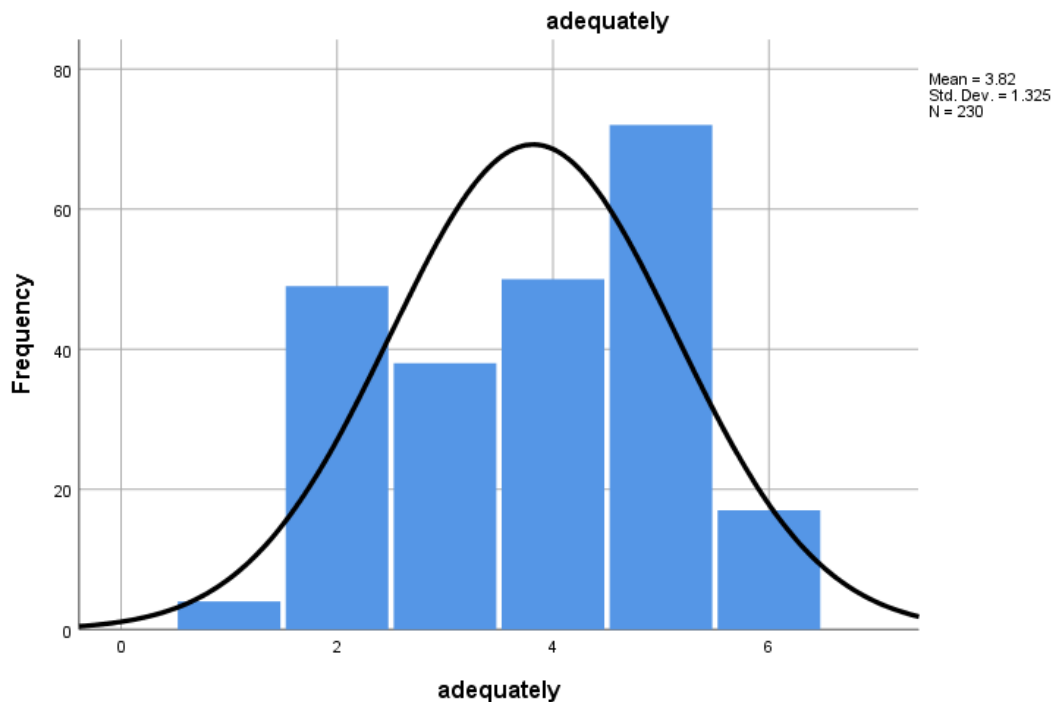


Figure 12: Descriptive statistics for cases where safety and environmental risks were not appropriately addressed.

- Do you think there is a need for stricter regulations and enforcement to mitigate safety and environmental risks in Saudi Arabia?

There may be a need for some regulations and legislation that may be more stringent in order to mitigate and eliminate risks related to safety and the environment in the Kingdom of Saudi Arabia. Some believed that the current regulations and legislation were doing their job well, while others were moving toward idealism to implement regulations and legislation that could eliminate risks related to safety and the environment in the Kingdom of Saudi Arabia.

Do you think there is a need for stricter regulations and enforcement to mitigate safety and environmental risks in Saudi Arabia?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	1.7	1.7	1.7
	Agree	45	19.6	19.6	21.3
	Disagree	50	21.7	21.7	43.0
	Neither agree nor disagree	44	19.1	19.1	62.2
	Strongly agree	58	25.2	25.2	87.4
	Strongly disagree	29	12.6	12.6	100.0
	Total	230	100.0	100.0	

Table 9: Descriptive statistics of the need for more stringent regulations and enforcement to mitigate safety and environmental risks

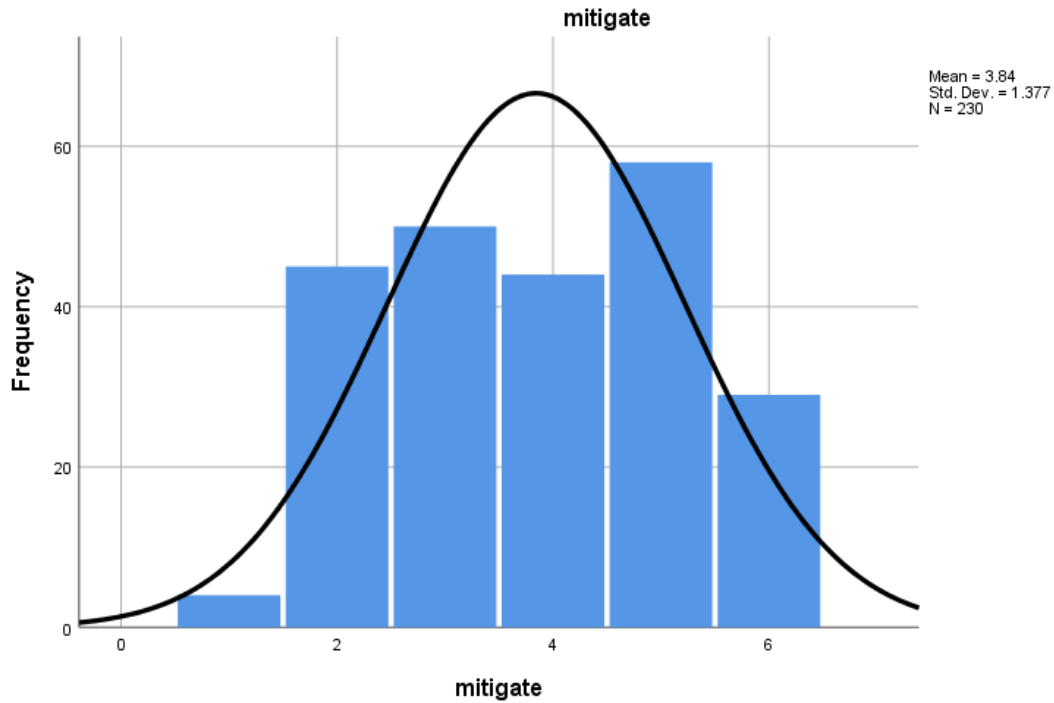


Figure 13: Descriptive statistics of the need for more stringent regulations and enforcement to mitigate safety and environmental risks.

- Do you believe that public awareness and education about safety and environmental risks in Saudi Arabia are sufficient?

Before discussing any problem, there must be awareness and education about the problem, the risks, and how to address and deal with them. There must be education about safety and environmental risks in the Kingdom of Saudi Arabia. A good percentage of importance was placed on education and public awareness of the importance of the problem.

Do you believe that public awareness and education about safety and environmental risks in Saudi Arabia are sufficient?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	1.3	1.3	1.3
	Agree	42	18.3	18.3	19.6
	Disagree	40	17.4	17.4	37.0
	Neither agree nor	50	21.7	21.7	58.7

	disagree				
	Strongly agree	46	20.0	20.0	78.7
	Strongly disagree	49	21.3	21.3	100.0
	Total	230	100.0	100.0	

Table 10: Descriptive statistics for public awareness and education about safety and environmental risks

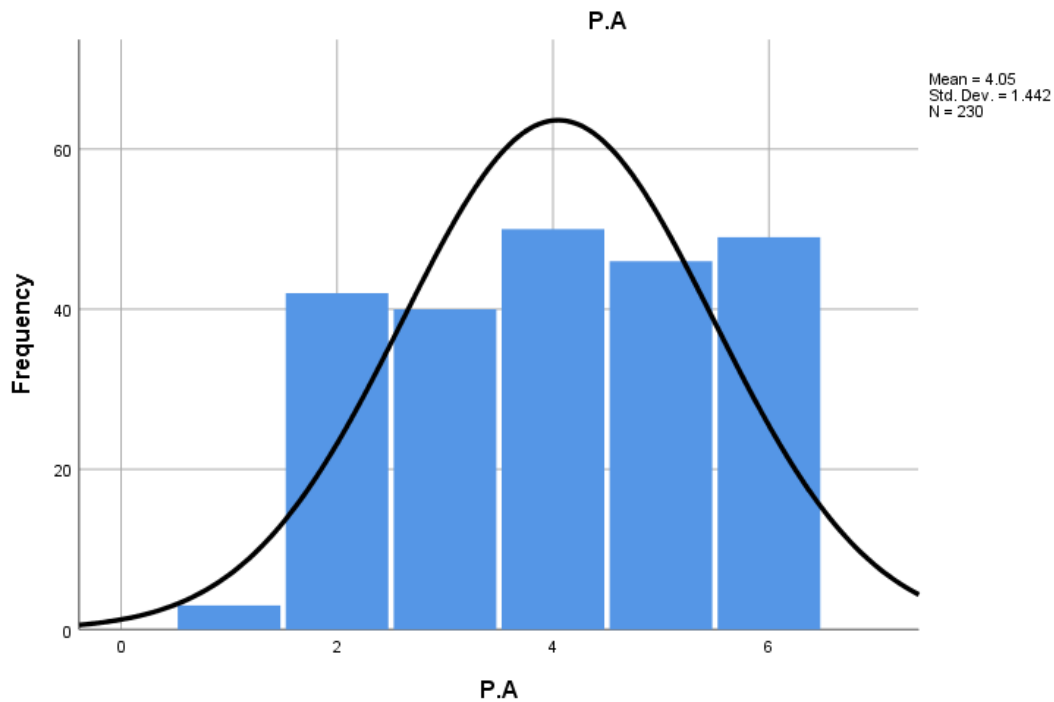


Figure 14: Descriptive statistics for public awareness and education about safety and environmental risks.

- **Are you aware of any initiatives or programs in Saudi Arabia aimed at managing safety and environmental risks?**

By looking at the Kingdom's Vision 2030, many initiatives and programs around sustainability and environmental and climate preservation aim to manage risks related to safety and the environment, whose importance and what they provide to the Kingdom must be recognized. A large percentage recognized and were aware of these initiatives and programs.

Are you aware of any initiatives or programs in Saudi Arabia aimed at managing safety and environmental risks?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	2.2	2.2	2.2
	Agree	34	14.8	14.8	17.0
	Disagree	43	18.7	18.7	35.7
	Neither agree nor disagree	57	24.8	24.8	60.4
	Strongly agree	55	23.9	23.9	84.3
	Strongly disagree	36	15.7	15.7	100.0
	Total	230	100.0	100.0	

Table 11: Statistical description of initiatives or programs that aim to manage risks related to safety and the environment

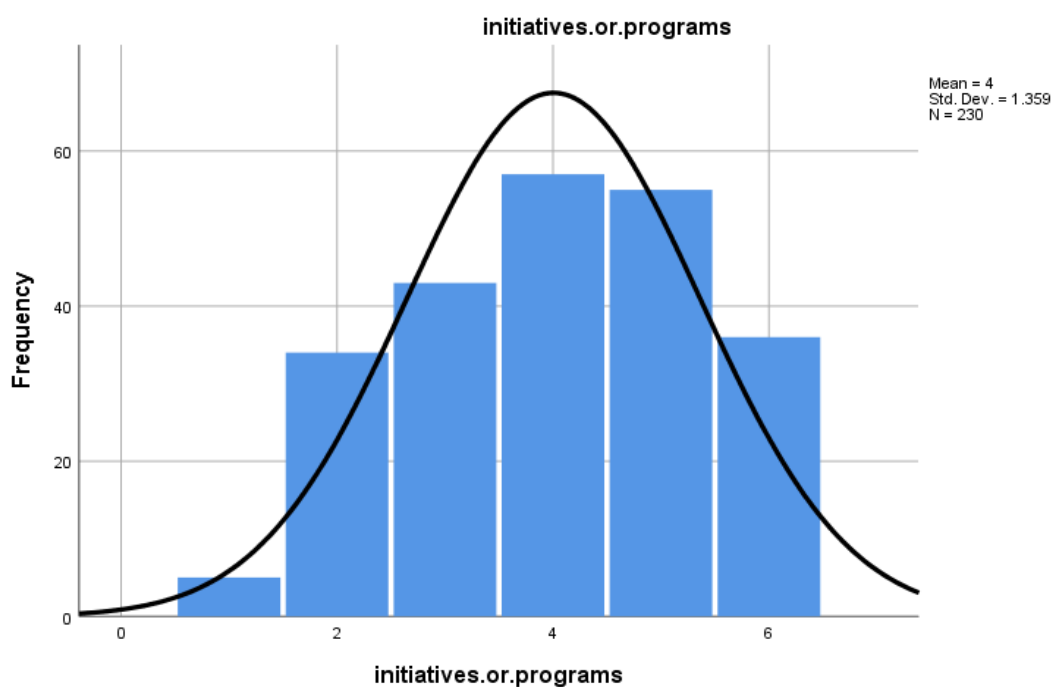


Figure 15: Statistical description of initiatives or programs that aim to manage risks related to safety and the environment.

- Are you satisfied with the waste management practices and recycling infrastructure available in your community in Saudi Arabia?

Due to rapid industrialization, high population growth, and rapid urbanization, waste management is a top priority for Saudi Arabia, with more than 106 million tons of waste expected to be processed by 2035. The municipal services line item in the Saudi government's 2022 budget is \$50 billion, the Same as estimated spending for 2021. Saudi Arabia produces about 53 million tons of waste annually, polluting its soil and groundwater. According to the National Center for Waste Management in the Kingdom of Saudi Arabia, environmental degradation caused by solid waste in 2021 is estimated to cost \$1.3 billion. Nearly half of the total waste comes from three major cities: 21% from Riyadh, 14% from Jeddah, and 8% from Dammam. Most landfills in Saudi Arabia are about to reach their maximum capacity. Saudis make extensive use of single-use products, particularly single-use plastics. Recycling is limited. Most municipal waste is disposed of untreated in landfills, while some is incinerated. Once landfill sites are complete, the land cannot be used for other purposes. Landfills in Saudi Arabia are usually not designed to reduce their harmful effects. According to the former CEO of the Saudi Investment Recycling Company, most of the country's waste is currently landfilled at an average of \$1.87 per ton. Accordingly, waste management is of great importance in Saudi society (trade, 2022).

Are you satisfied with the waste management practices and recycling infrastructure available in your community in Saudi Arabia?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	1.3	1.3	1.3
	Agree	37	16.1	16.1	17.4
	Disagree	35	15.2	15.2	32.6
	Neither agree nor disagree	50	21.7	21.7	54.3
	Strongly agree	71	30.9	30.9	85.2
	Strongly disagree	34	14.8	14.8	100.0
	Total	230	100.0	100.0	

Table 12: Descriptive statistics of waste management practices and recycling infrastructure available in the community

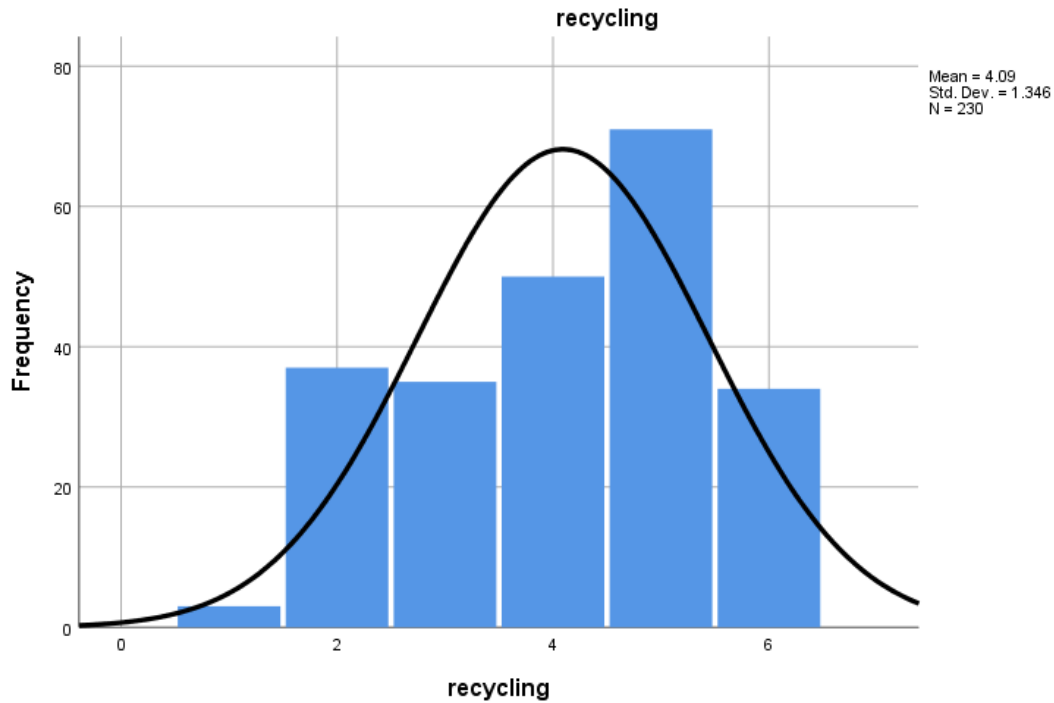


Figure 16: Descriptive statistics of waste management practices and recycling infrastructure available in the community.

- **Do you believe the government is doing enough to promote renewable energy sources and reduce the dependence on fossil fuels in Saudi Arabia?**

The focus on developing renewable energy in Saudi Arabia, especially solar photovoltaic technology, could have global implications as the world seeks to shift to cleaner energy sources. The Saudi economy depends to a large extent on oil and fossil fuels, and the government has tended to rely on renewable energy sources for the sake of sustainability and achieving other goals related to the environment. The percentage of agreement and strong agreement was considered significant and dominant in that section.

Do you believe the government is doing enough to promote renewable energy sources and reduce the dependence on fossil fuels in Saudi Arabia?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	1.3	1.3	1.3
	Agree	44	19.1	19.1	20.4
	Disagree	34	14.8	14.8	35.2

	Neither agree nor disagree	49	21.3	21.3	56.5
	Strongly agree	60	26.1	26.1	82.6
	Strongly disagree	40	17.4	17.4	100.0
	Total	230	100.0	100.0	

Table 13: Descriptive statistics to enhance renewable energy sources and reduce dependence on fossil fuels in the Kingdom of Saudi Arabia

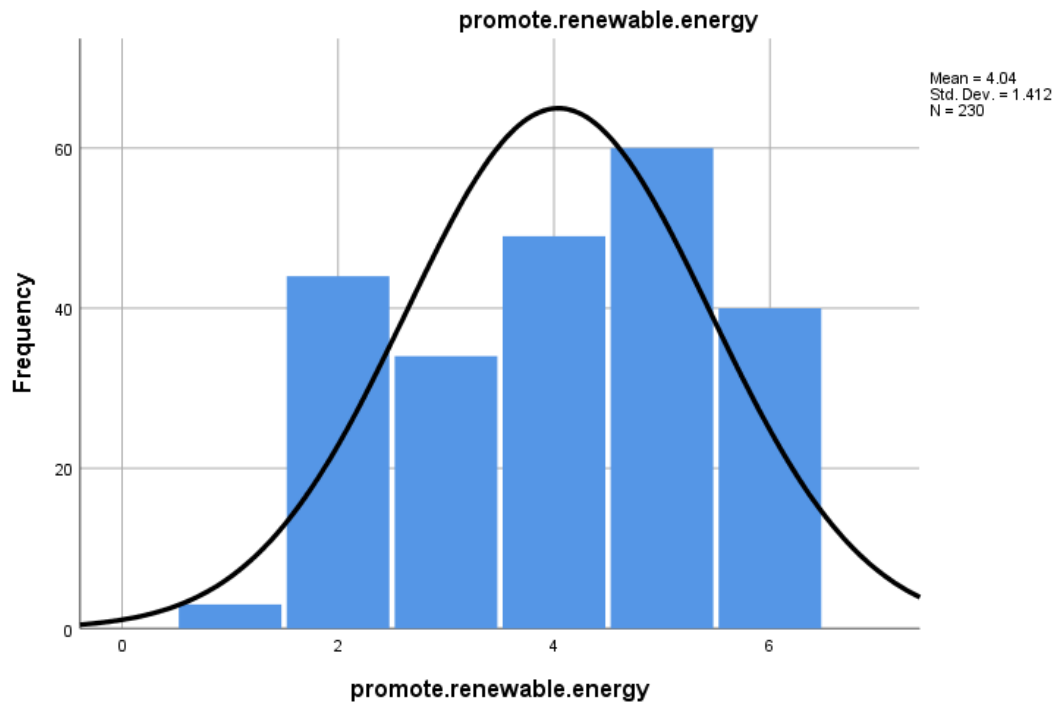


Figure 17: Descriptive statistics to enhance renewable energy sources and reduce dependence on fossil fuels in the Kingdom of Saudi Arabia.

- **Have you noticed any improvement in safety and environmental practices in Saudi Arabia over the past few years?**

By looking at the Kingdom's Vision 2030, there are many improvements that the Kingdom has made in the past years. We can see the percentage of approval and strong approval for this proposal.

Have you noticed any improvement in safety and environmental practices in Saudi Arabia over the past few years?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	1.7	1.7	1.7
	Agree	42	18.3	18.3	20.0
	Disagree	39	17.0	17.0	37.0
	Neither agree nor disagree	53	23.0	23.0	60.0
	Strongly agree	59	25.7	25.7	85.7
	Strongly disagree	33	14.3	14.3	100.0
	Total	230	100.0	100.0	

Table 14: Statistical practices for improvement in safety and environmental practices in the Kingdom of Saudi Arabia over the past few years

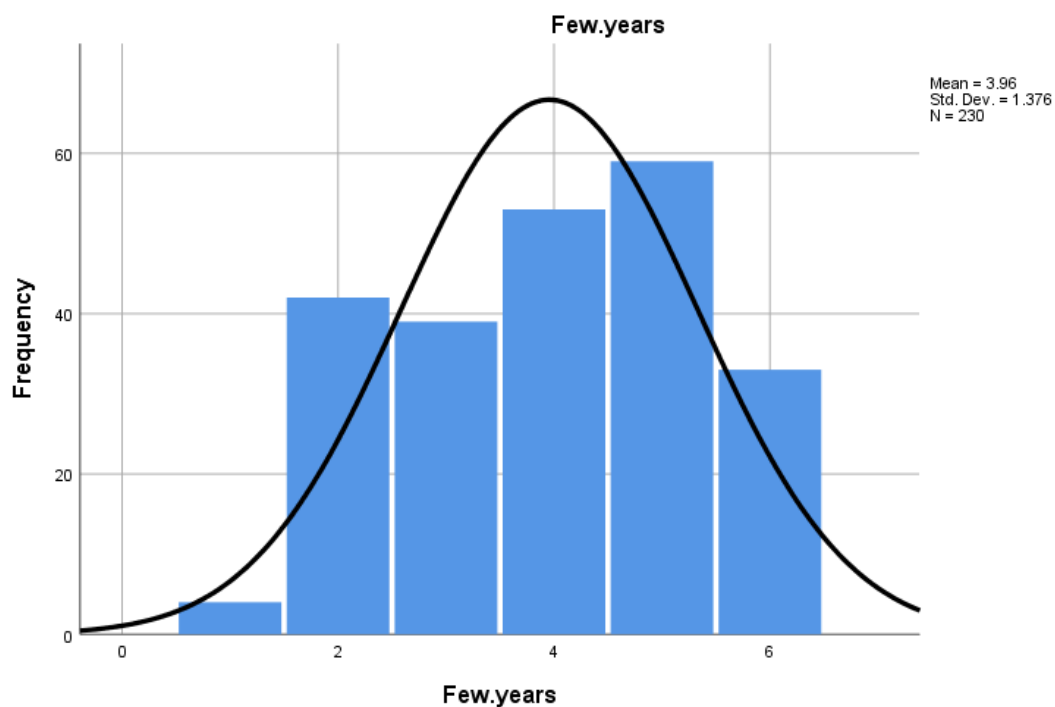


Figure 18: Statistical practices for improvement in safety and environmental practices in the Kingdom of Saudi Arabia over the past few years.

- Do you think there is sufficient collaboration between the government, industries, and communities in Saudi Arabia to address safety and environmental risks?

In order to improve the health, safety and environmental risks that exist in Saudi Arabia, there must be cooperation between government, industries and communities. There was great approval for this decision.

industries					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	1.3	1.3	1.3
	Agree	44	19.1	19.1	20.4
	Disagree	53	23.0	23.0	43.5
	Neither agree nor disagree	39	17.0	17.0	60.4
	Strongly agree	56	24.3	24.3	84.8
	Strongly disagree	35	15.2	15.2	100.0
	Total	230	100.0	100.0	

Table 15: Statistical practices for collaboration between government, industries and communities to address safety and environmental risks

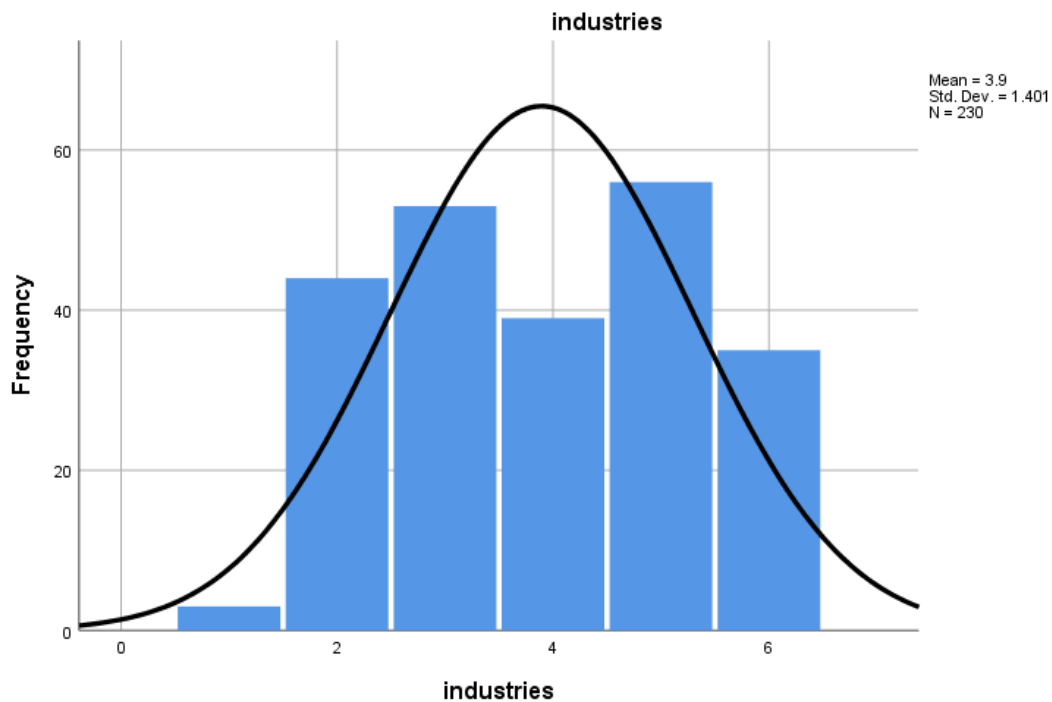


Figure 19: Statistical practices for collaboration between government, industries and communities to address safety and environmental risks.

- **Do you think sustainability helps reduce health and safety risks?**

Sustainability can be integrated into occupational health by conducting environmental impact assessments, identifying potential hazards, and implementing preventive measures to ensure the work environment conforms to sustainability principles while maintaining worker health. Accordingly, the percentage of approval and strong agreement was more than 35%.

Do you think sustainability helps reduce health and safety risks?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	1.7	1.7	1.7
	Agree	38	16.5	16.5	18.3
	Disagree	46	20.0	20.0	38.3
	Neither agree nor disagree	49	21.3	21.3	59.6
	Strongly agree	32	13.9	13.9	73.5
	Strongly disagree	61	26.5	26.5	100.0
	Total	230	100.0	100.0	

Table 16: Statistical description of sustainability and its relationship to reducing health and safety risks

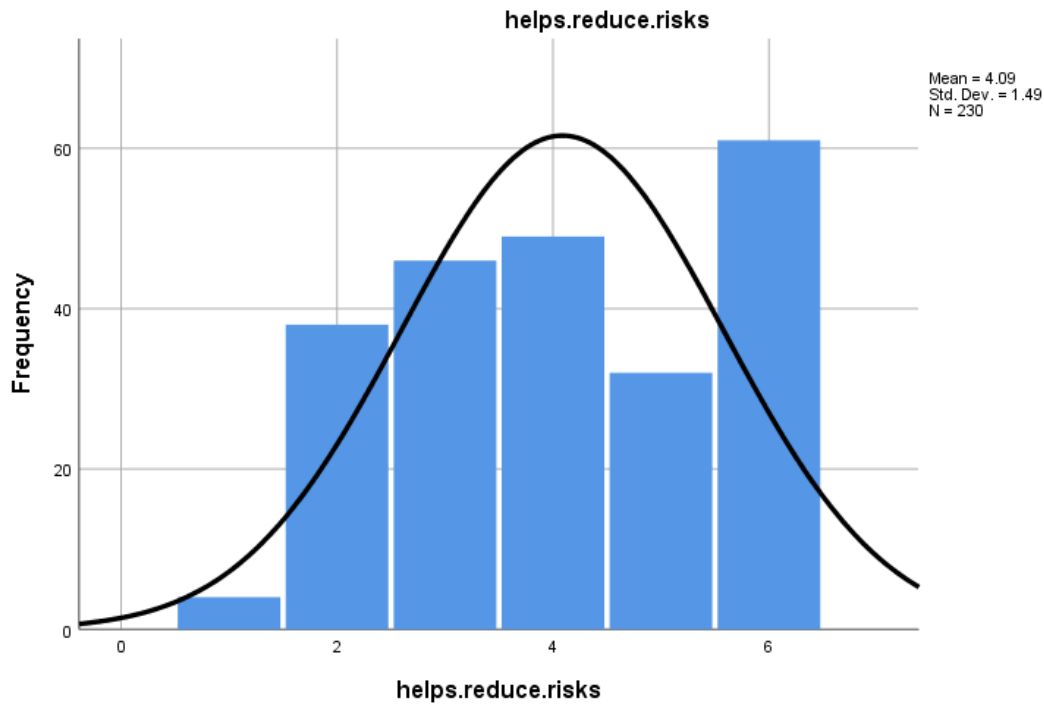


Figure 20: Statistical description of sustainability and its relationship to reducing health and safety risks

- Do you think that legislation and legal regulations can help reduce health and safety risks?

Government legislation provides workers with minimum health and safety standards in the workplace.

However, minimum standards can always be made more protective through more vital legislation.

Accordingly, there was broad agreement on the importance of government legislation and regulations in order to reduce health and safety risks.

Do you think that legislation and legal regulations can help reduce health and safety risks?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	2.6	2.6	2.6
	Agree	37	16.1	16.1	18.7
	Disagree	38	16.5	16.5	35.2
	Neither agree nor disagree	66	28.7	28.7	63.9
	Strongly agree	45	19.6	19.6	83.5

	Strongly disagree	38	16.5	16.5	100.0
	Total	230	100.0	100.0	

Table 17: Descriptive statistics of legislation and legal regulations that can help reduce health and safety risks.

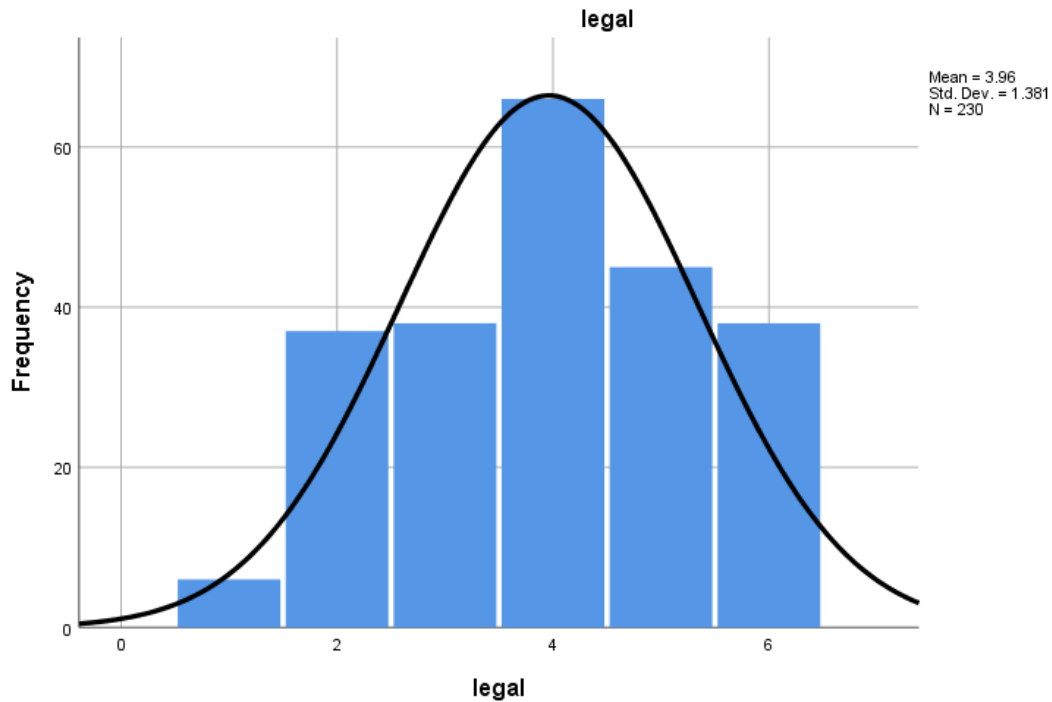


Figure 21: Descriptive statistics of legislation and legal regulations that can help reduce health and safety risks.

- **Do you believe that increasing medical and cultural awareness can reduce health and safety risks?**

Cultural awareness helps us break down cultural barriers, build cultural bridges, and learn to appreciate people who are different from us. We can communicate better with people with cultural differences when we understand ourselves better. This leads to more cultural contact and less cultural conflict. When we encounter new languages and cultures, we begin to make comparisons and realize that our behaviors, values, and beliefs are not the general norms found elsewhere in the world. Through awareness campaigns, including medical

and cultural awareness, and talking about the harms and benefits, through which we can reduce health and safety risks.

Do you believe that increasing medical and cultural awareness can reduce health and safety risks?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	1.3	1.3	1.3
	Agree	54	23.5	23.5	24.8
	Disagree	44	19.1	19.1	43.9
	Neither agree nor disagree	49	21.3	21.3	65.2
	Strongly agree	44	19.1	19.1	84.3
	Strongly disagree	36	15.7	15.7	100.0
	Total	230	100.0	100.0	

Table 18: Descriptive statistics of the impact of increased medical awareness on health and safety risks

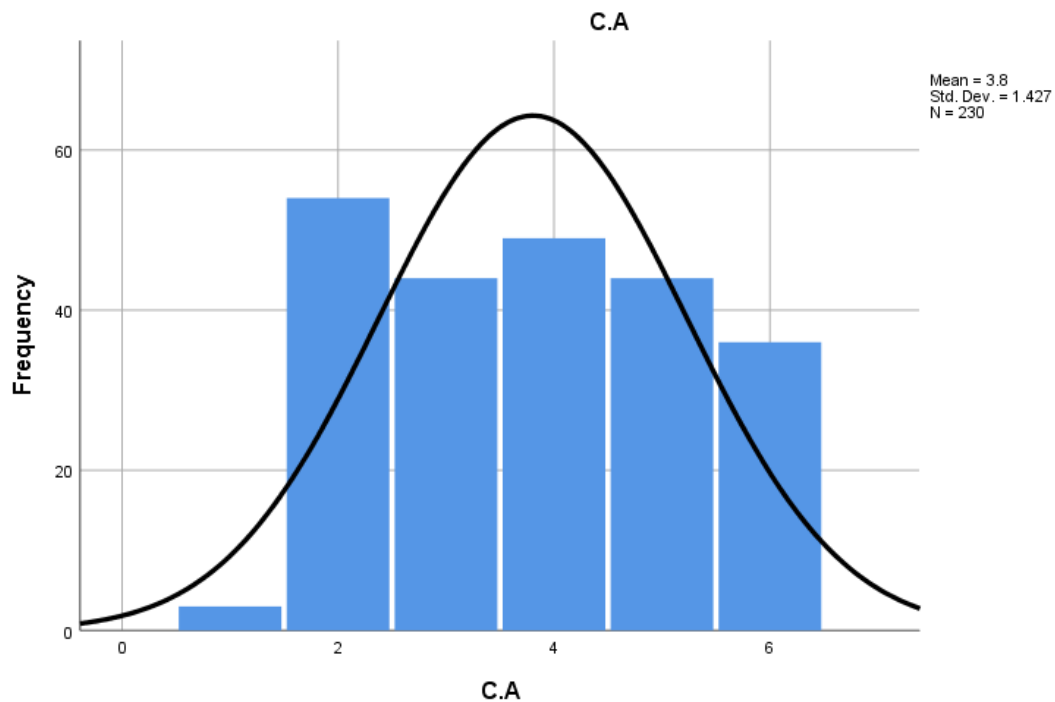


Figure 22: Descriptive statistics of the impact of increased medical awareness on health and safety risks.

- **Can the quality of life in which a community lives be an effective factor in increasing or decreasing the level of health and safety risks?**

Quality of life is a highly subjective measure of happiness and is a key component of many financial decisions. Factors that play a role in quality of life vary according to personal preferences, but often include financial security, job satisfaction, family life, health, and safety. Health-related quality of life (HRQL) focuses on the impact of health on a person's ability to live a fulfilling life. HRQL represents broad concepts of physical and psychological functioning with social functioning and well-being that include positive and negative aspects. Accordingly, there was a large percentage of agreement and strong agreement that quality of life is very important in order to mitigate environmental health and safety risks.

Can the quality of life in which a community lives be an effective factor in increasing or decreasing the level of health and safety risks?					
		Frequenc y	Percent	Valid Percent	Cumulative Percent
Valid	1	4	1.7	1.7	1.7
	Agree	48	20.9	20.9	22.6
	Disagree	41	17.8	17.8	40.4
	Neither agree nor disagree	37	16.1	16.1	56.5
	Strongly agree	67	29.1	29.1	85.7
	Strongly disagree	33	14.3	14.3	100.0
	Total	230	100.0	100.0	

Table 19: Descriptive statistics on the possibility of the quality of life experienced by society being an effective factor in increasing or decreasing the level of risks to health and safety

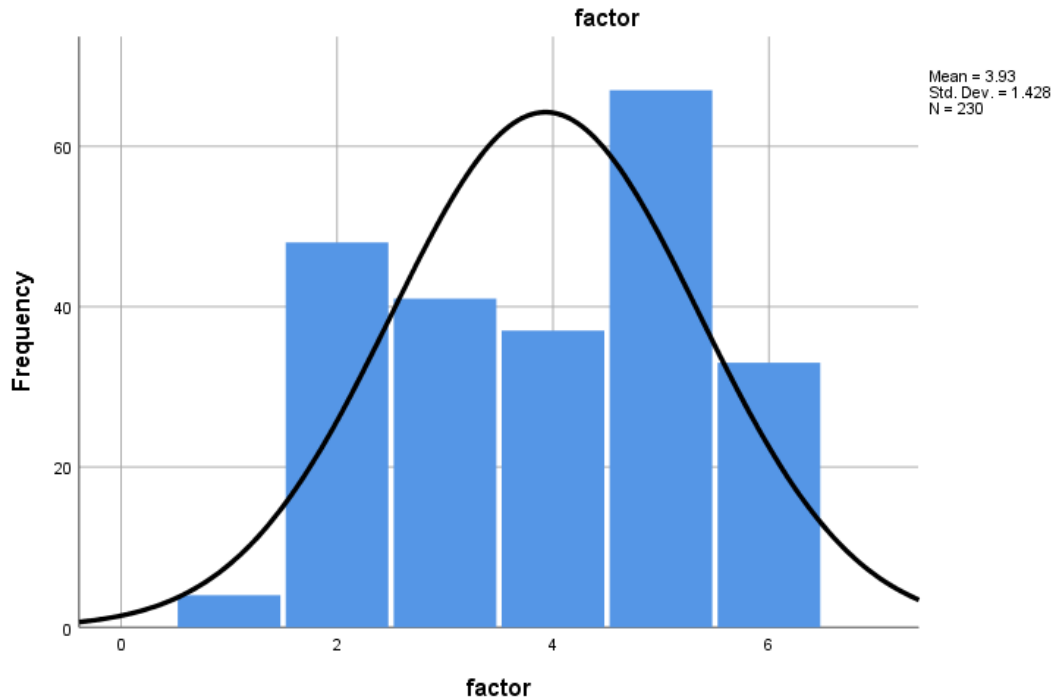


Figure 23: Descriptive statistics on the possibility of the quality of life experienced by society being an effective factor in increasing or decreasing the level of risks to health and safety.

- **Do you believe that environmental safety can enhance human social and economic life?**

The natural environment provides many services that are difficult to measure in dollars. Natural areas help clean our air, purify our water, produce food and medicine, reduce chemical and noise pollution, slow floodwaters, and cool our streets. There was a harmony of approval and rejection of this proposal, as many respondents had different opinions.

Do you believe that environmental safety can enhance human social and economic life?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	1.3	1.3	1.3
	Agree	36	15.7	15.7	17.0
	Disagree	42	18.3	18.3	35.2
	Neither agree nor disagree	59	25.7	25.7	60.9
	Strongly agree	51	22.2	22.2	83.0
	Strongly disagree	39	17.0	17.0	100.0

	Total	230	100.0	100.0	
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Table 20: Descriptive statistics of the role of environmental safety in enhancing human social and economic life

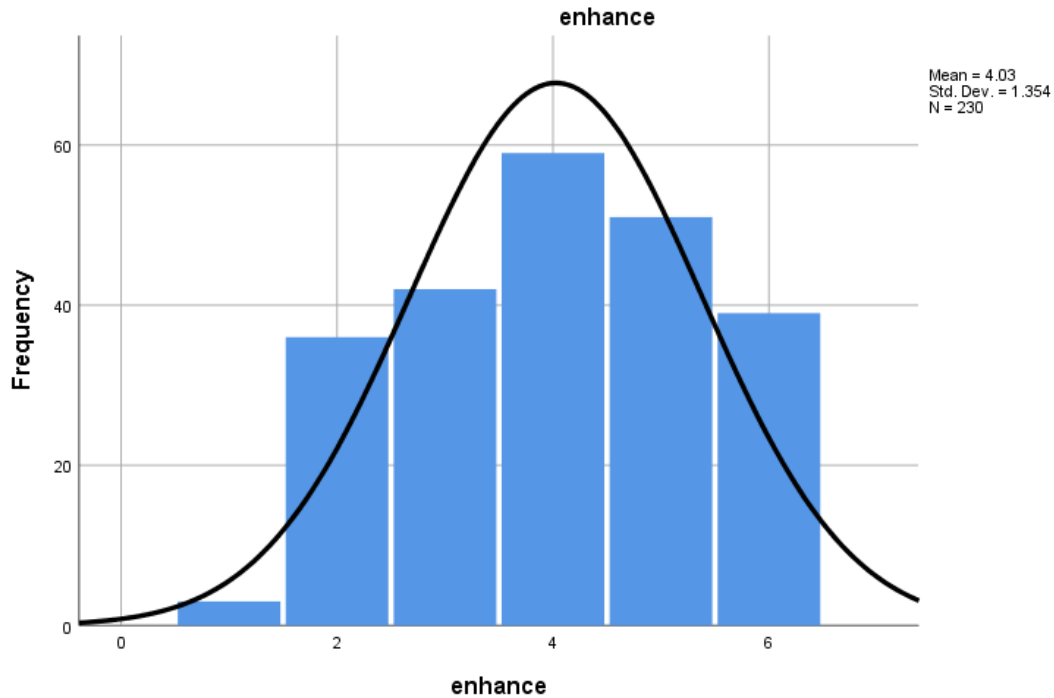


Figure 24: Descriptive statistics of the role of environmental safety in enhancing human social and economic life.

- Can we rely on the laws and legislation of the World Health Organization to reduce environmental health risks?

The mandate of the WHO Health and Environment Program is to support Member States to improve health outcomes associated with environmental risks such as unsafe water and inadequate sanitation poor indoor and outdoor air quality and exposure to toxic or hazardous waste and chemicals. Accordingly, the World Health Organization legislation, being an accredited global organization, can be used to reduce global risks.

Can we rely on the laws and legislation of the World Health Organization to reduce environmental health risks?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	1.7	1.7	1.7

d	Agree	47	20.4	20.4	22.2
	Disagree	38	16.5	16.5	38.7
	Neither agree nor disagree	57	24.8	24.8	63.5
	Strongly agree	37	16.1	16.1	79.6
	Strongly disagree	47	20.4	20.4	100.0
	Total	230	100.0	100.0	

Table 21: Descriptive statistics to reduce environmental health risks based on the laws and legislation of the World Health Organization

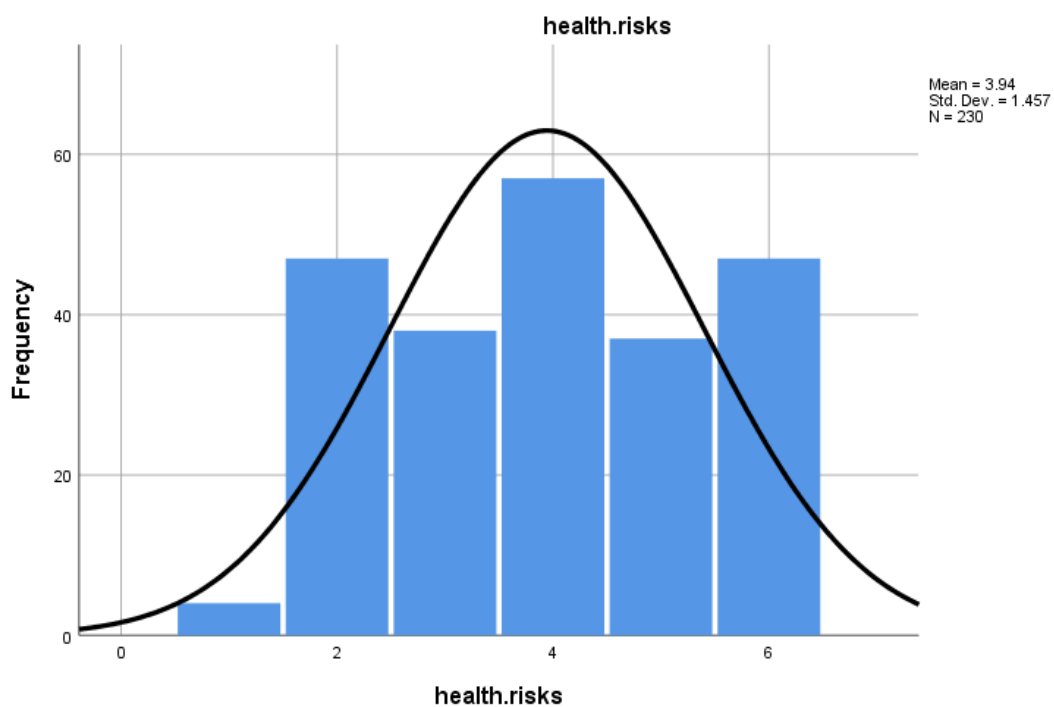


Figure 25: Descriptive statistics to reduce environmental health risks based on the laws and legislation of the World Health Organization.

- Do you think that the Kingdom of Saudi Arabia is moving steadily in accordance with Vision 2030 towards reducing health and safety risks?

What the Kingdom of Saudi Arabia is doing in terms of developments and improvements to mitigate risks can appear before us, and we can witness the developments undertaken by the Kingdom.

Do you think that the Kingdom of Saudi Arabia is moving steadily in accordance with Vision 2030 towards reducing health and safety risks?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	1.7	1.7	1.7
	Agree	49	21.3	21.3	23.0
	Disagree	42	18.3	18.3	41.3
	Neither agree nor disagree	45	19.6	19.6	60.9
	Strongly agree	66	28.7	28.7	89.6
	Strongly disagree	24	10.4	10.4	100.0
	Total	230	100.0	100.0	

Table 22: Descriptive statistics of the progress of the Kingdom of Saudi Arabia in accordance with Vision 2030 towards reducing health and safety risks

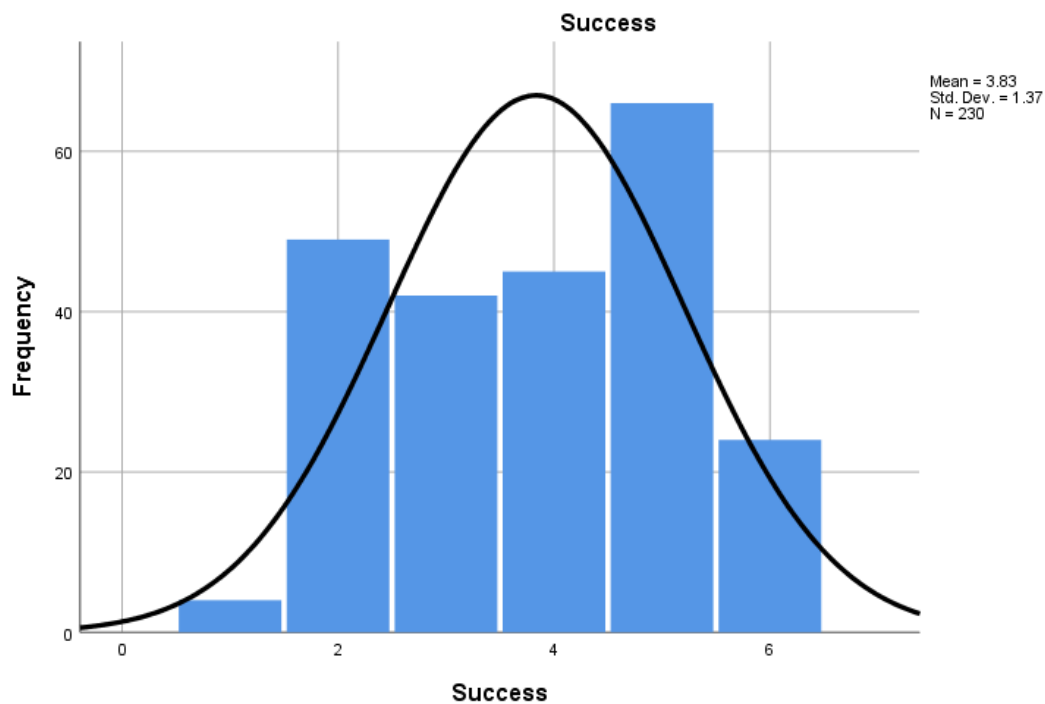


Figure 26: Descriptive statistics of the progress of the Kingdom of Saudi Arabia in accordance with Vision 2030 towards reducing health and safety risks.

3.3. Sixth chapter: Results and proposal analysis

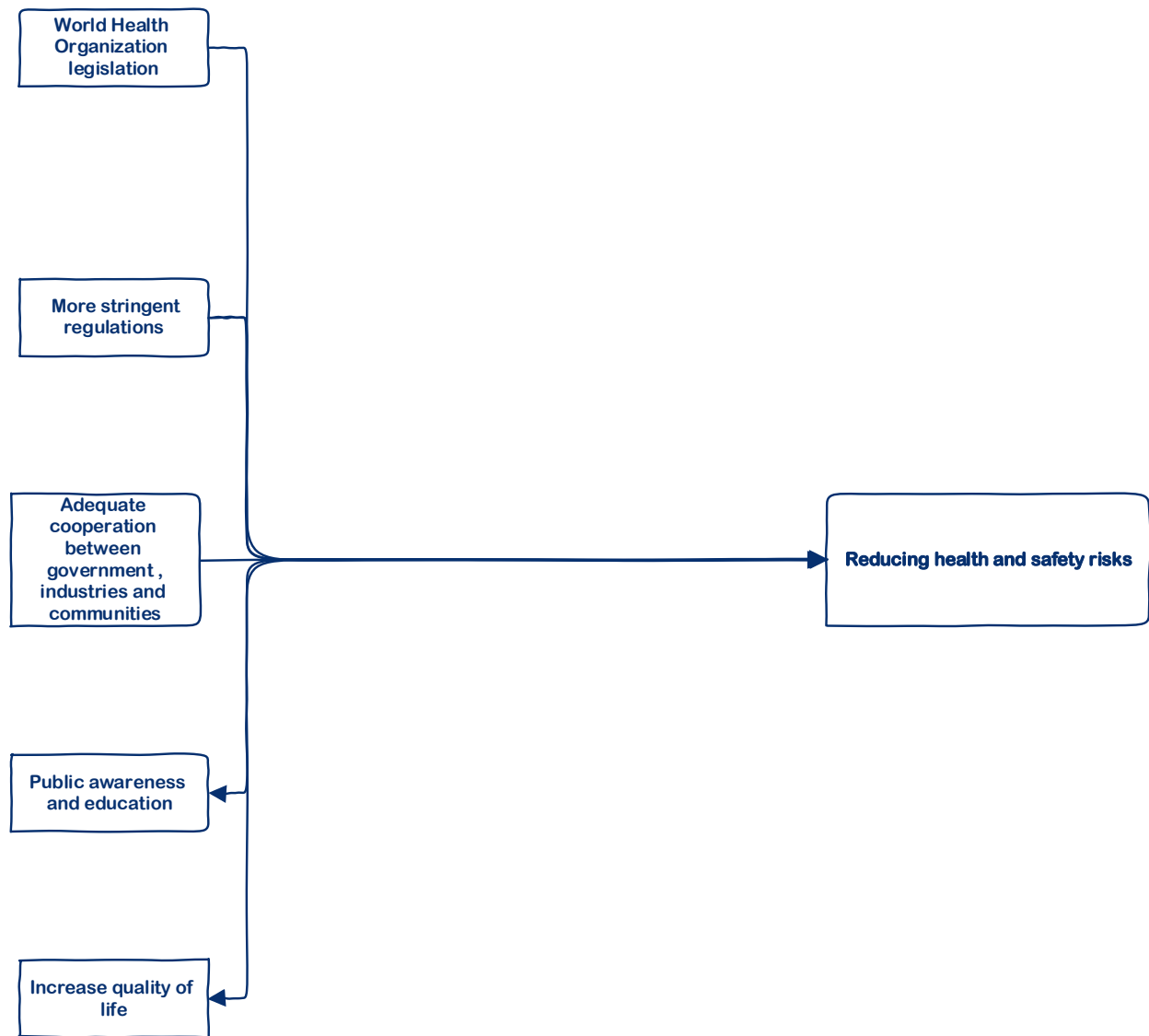


Figure 27: Dependent and independent variables.

Research hypothesis

In this research, we will discuss setting assumptions for the research, and we will examine some of the influences that can affect environmental risks in the Kingdom of Saudi Arabia:

- **H0:** What are the effects of following World Health Organization legislation in reducing environmental risks in the Kingdom of Saudi Arabia?
- **H01:** What is the impact of establishing and following more stringent regulations in reducing environmental risks in the Kingdom of Saudi Arabia?
- **H02:** What is the impact of increasing public awareness and education in reducing environmental risks in the Kingdom of Saudi Arabia?
- **H03:** How can appropriate cooperation between government, industries and communities exist in reducing environmental risks in the Kingdom of Saudi Arabia?
- **H04:** What is the importance of increasing the quality of life in reducing environmental risks in the Kingdom of Saudi Arabia?

- **What is the impact of establishing and following more stringent regulations in reducing environmental risks in the Kingdom of Saudi Arabia?**

By following more stringent regulations, we can achieve perfection in preserving the environment and reducing risks. A degree of freedom equal to 25 may indicate the presence of dispersion between the study variables, and people may prefer to avoid dealing with these situations with the required severity.

Environmental risks must be dealt with with leniency, advice, and guidance, and a tendency toward environmental and medical awareness instead. From the strictness of the laws

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	140.432 ^a	25	.000
Likelihood Ratio	40.949	25	.023

Linear-by-Linear Association	2.274	1	.132
N of Valid Cases	230		
a. 14 cells (38.9%) have expected count less than 5. The minimum expected count is .07.			

Table 23: Chi-Square Tests of the impact of establishing and following more stringent regulations in reducing environmental risks in the Kingdom of Saudi Arabia

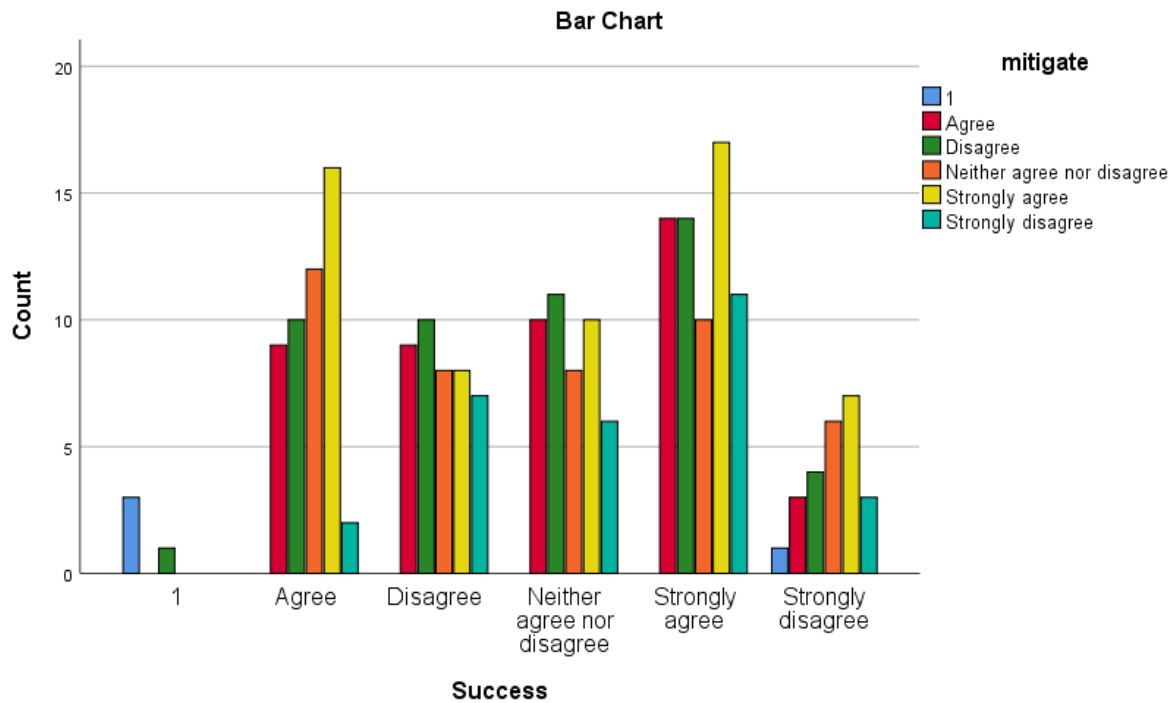


Figure 28: Symmetric Measures of the impact of establishing and following more stringent regulations in reducing environmental risks in the Kingdom of Saudi Arabia.

- **What is the impact of increasing public awareness and education in reducing environmental risks in the Kingdom of Saudi Arabia**

There may be great importance for cultural awareness to play a significant role in reducing risks in the Kingdom of Saudi Arabia, despite the dispersion of data that we may see in the illustration attached below. Although the degree of freedom is equal to 25 and indicates the presence of dispersion among our data, we

cannot ignore the importance of cultural and educational awareness to reduce environmental risks, and these issues must be focused on in the future.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	184.033 ^a	25	.000
Likelihood Ratio	41.803	25	.019
Linear-by-Linear Association	3.361	1	.067
N of Valid Cases	230		
a. 14 cells (38.9%) have expected count less than 5. The minimum expected count is .05.			

Table 24: Chi-Square Tests of the impact of increasing public awareness and education in reducing environmental risks in the Kingdom of Saudi Arabia.

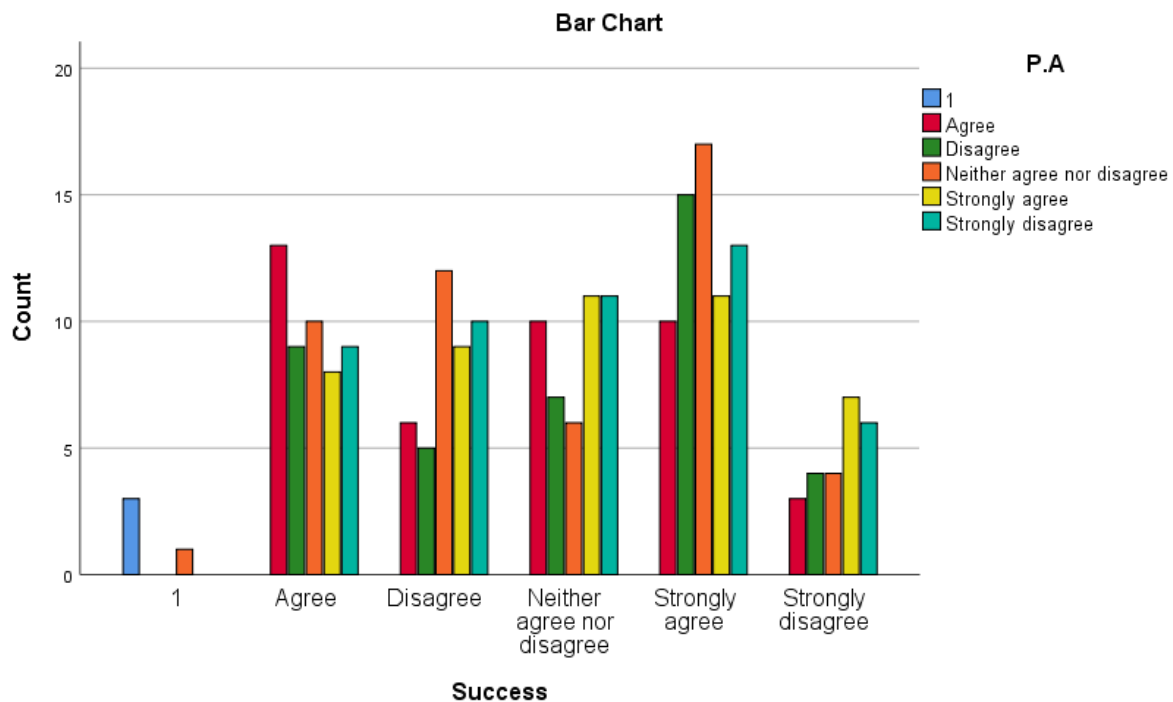


Figure 29: Symmetric Measures of the impact of increasing public awareness and education in reducing environmental risks in the Kingdom of Saudi Arabia.

- **How can appropriate cooperation between government, industries and communities exist in reducing environmental risks in the Kingdom of Saudi Arabia?**

Communities, private and public governments, and industries, including people, share in increasing environmental risks, and there must be cooperation between them to reduce environmental risks. The degree of freedom in this analysis is equal to 25 and indicates the dispersion of the data and their distance from each other. However, we must recognize the role of excellent cooperation and partnership between these organizations to prepare plans to reduce environmental risks, and awareness must be raised about this.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	190.073 ^a	25	.000
Likelihood Ratio	47.577	25	.004
Linear-by-Linear Association	4.711	1	.030
N of Valid Cases	230		
a. 14 cells (38.9%) have expected count less than 5. The minimum expected count is .05.			

Table 25: Chi-Square Tests For cooperation between government, industries and communities to reduce environmental risks in Saudi Arabia

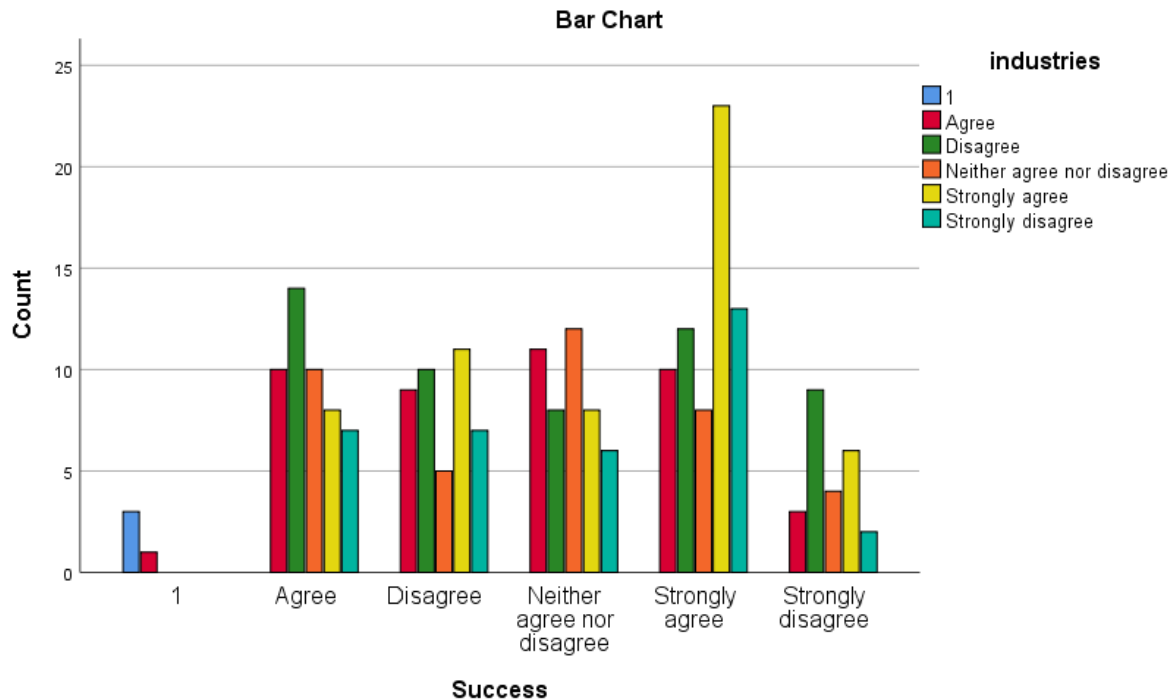


Figure 30: Symmetric Measures For cooperation between government, industries and communities to reduce environmental risks in Saudi Arabia.

- What is the importance of increasing the quality of life in reducing environmental risks in the Kingdom of Saudi Arabia

Increasing the quality of life can have a cultural and qualitative impact, increase environmental development, and reduce the risks surrounding humans. Many people agree and strongly agree with the importance of increasing the quality of life to reduce environmental risks.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	196.839 ^a	25	.000
Likelihood Ratio	57.196	25	.000
Linear-by-Linear Association	7.420	1	.006
N of Valid Cases	230		
a. 14 cells (38.9%) have expected count less than 5. The minimum			

expected count is .05.

Table 26: Chi-square tests of the importance of increasing the quality of life in reducing environmental risks in the Kingdom of Saudi Arabia

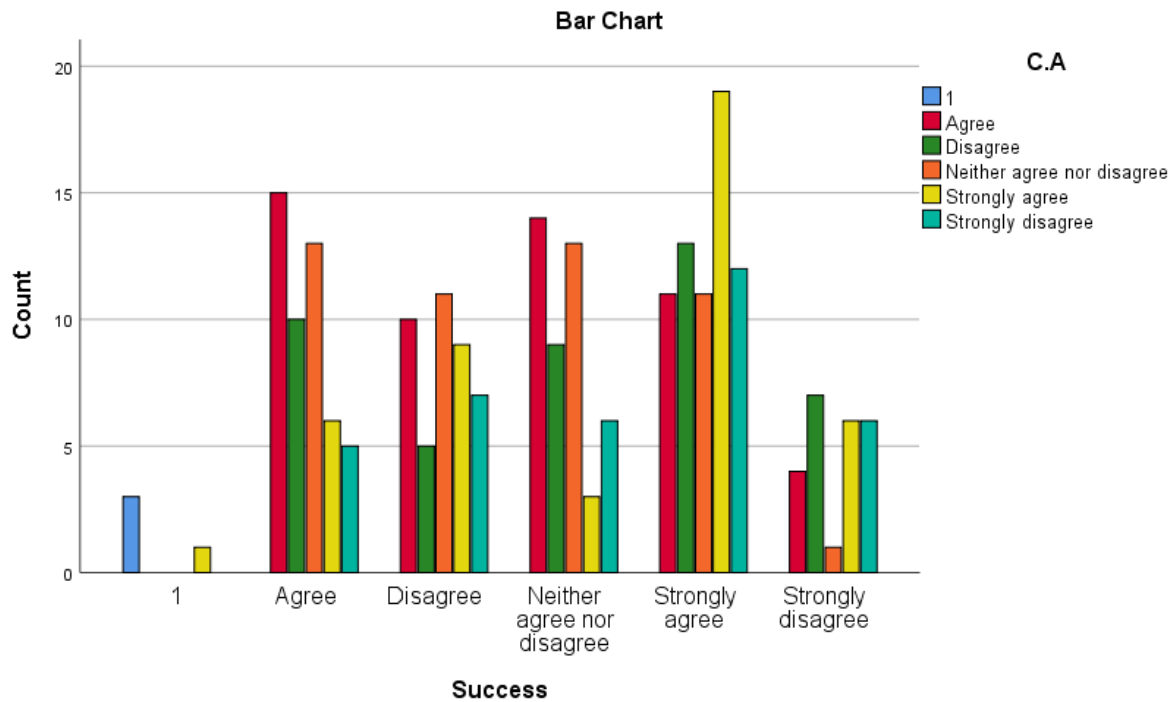


Figure 31: Symmetric Measures of the importance of increasing the quality of life in reducing environmental risks in the Kingdom of Saudi Arabia

- **What are the effects of following World Health Organization legislation in reducing environmental risks in the Kingdom of Saudi Arabia?**

What the World Health Organization is doing in legislating laws and legislation in order to preserve the environment and reduce environmental risks can help many societies in challenging environmental risks.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	207.462 ^a	25	.000
Likelihood Ratio	67.811	25	.000

Linear-by-Linear Association	4.123	1	.042
N of Valid Cases	230		
a. 14 cells (38.9%) have expected count less than 5. The minimum expected count is .05.			

Table 27: Chi-square tests of the effects of following World Health Organization legislation in reducing environmental risks in the Kingdom of Saudi Arabia

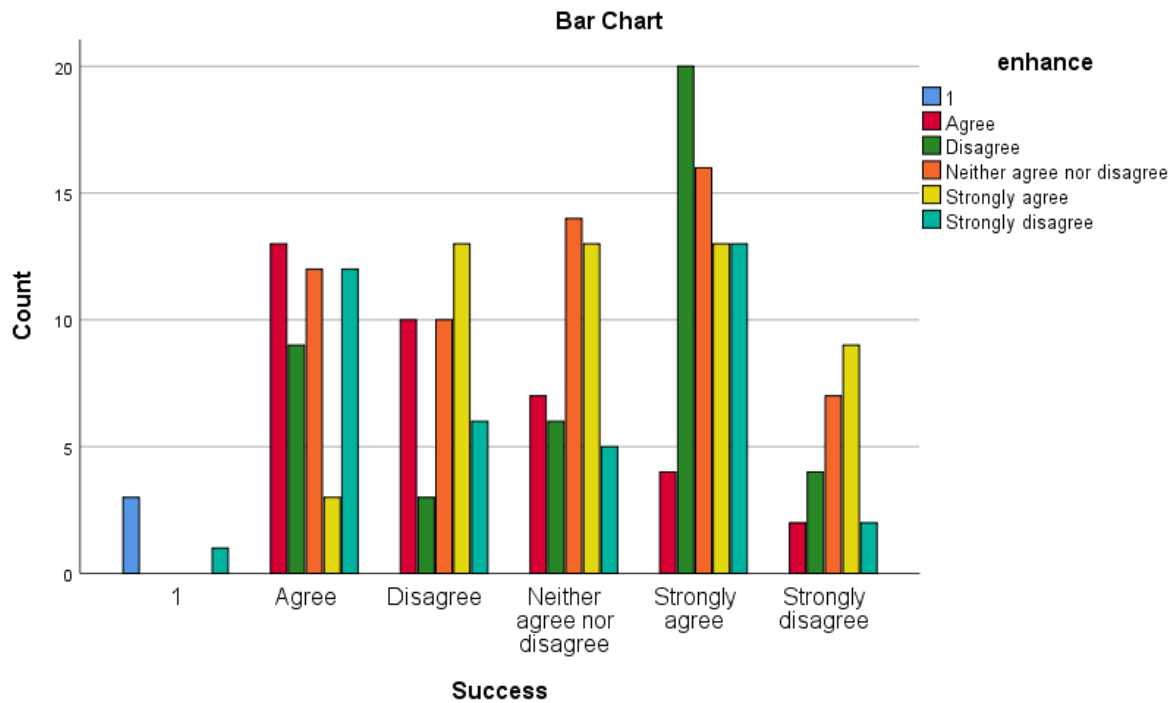


Figure 32: Symmetric Measures of the effects of following World Health Organization legislation in reducing environmental risks in the Kingdom of Saudi Arabia.

Bayesian Regression

The mean of one parameter in Bayesian linear regression is defined as a weighted sum of the other variables.

This form of conditional modeling seeks to discover the prior distribution of regressors as well as other factors that specify the regression assignment) Moreover, it eventually allows for out-of-sample regression prediction based on observations of the regression coefficients. Bayesian regression may be highly effective when a data collection has very little or poorly dispersed data. Unlike standard regression procedures, which generate

outputs from a single number for each feature, Bayesian regression models derive outputs from a probability distribution. The key advantage is that, unlike classical regression, which only provides a confidence range and a point estimate, Bayesian processing provides a complete set of inferential answers (towardsdatascience, 2023).

In this analysis, we will seek to know and measure the success of the Kingdom of Saudi Arabia in reducing environmental risks and preserving the environment by researching the following variables (following World Health Organization legislation, following the impact of strict legislation, increasing public awareness and education, appropriate cooperation between the government and industries). communities, the importance of increasing quality of life) Moreover, all in order to measure sustainability and reduce environmental risks. We will find that the degree of freedom is equal to 22, which indicates the closeness of the variables, the lack of dispersion between them, and the importance of those variables in reducing environmental risks. In addition, the value of Variance is equal to .486 and indicates the closeness of the data and the lack of dispersion between them.

ANOVA ^{a,b,c}					
Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	281.058	22	12.775	1.836	.015
Residual	1440.069	207	6.957		
Total	1721.128	229			
a. Dependent Variable: Success					
b. Model: (Intercept), enhance, C.A, industries, P.A, mitigate					
c. Regression Weight Variable: helps.reduce.risks					

Table 28: ANOVA analysis

Bayes Factor Model Summary ^{a,b,c}				
Bayes Factor ^d	R	R Square	Adjusted R Square	Std. Error of the Estimate
.000	.404	.163	.074	2.64

a. Method: JZS
b. Model: (Intercept), enhance, C.A, industries, P.A, mitigate
c. Regression Weight Variable: helps.reduce.risks
d. Bayes factor: Testing model versus null model (Intercept).

Table 29: Bayes Factor Model Summary

Bayesian Estimates of Error Variance ^a					
Parameter	Posterior			95% Credible Interval	
	Mode	Mean	Variance	Lower Bound	Upper Bound
Error variance	6.890	7.025	.486	5.789	8.519
a. Assume standard reference priors.					

Table 30: Bayesian Estimates of Error Variance^a

3.4. Recommendations

- Paying attention to health and safety guidelines that stipulate attention to environmental risks.
- Government trends regarding rationalization of environmental risks and the trend towards sustainability.
- Designing programs and initiatives to address environmental risks.
- Establishing some laws and legislation that are strict and serious, and implementing some penalties for those who violate environmental rights.
- The trend is to increase cultural and educational awareness about environmental risks.
- Paying attention to waste management practices and recycling infrastructure.
- Relying on renewable energy and sustainability and reducing dependence on fossil fuels.
- Establishing cooperation between communities and the public and private sectors to reduce sources of damage to the environment.
- Improving the quality of life and increasing medical awareness.
- Enhance and enforce safety and environmental regulations to ensure compliance across industries.
This includes developing and implementing stringent standards for air and water quality, waste management, and workplace safety.
- Encourage the adoption of sustainable practices across sectors. This can involve promoting renewable energy sources, implementing energy-efficient technologies, and supporting initiatives for waste reduction and recycling.

- Develop and maintain robust infrastructure systems to mitigate safety and environmental risks. This includes investing in well-designed roads, bridges, and public transportation systems that prioritize safety and minimize environmental impact.
- Establish and strengthen emergency response systems to effectively handle safety incidents and environmental disasters. This includes training emergency personnel, conducting regular drills, and ensuring the availability of necessary resources and equipment.
- Conduct public awareness campaigns to educate citizens about safety and environmental risks. Promote responsible behavior, such as proper waste disposal, water conservation, and adherence to safety protocols in workplaces and public spaces.

3.5. Conclusion

In conclusion, managing safety and environmental risks is of utmost importance for enhancing the quality of life in the Kingdom of Saudi Arabia. By strengthening regulatory frameworks, promoting sustainable practices, investing in infrastructure, enhancing emergency response systems, raising public awareness, encouraging research and innovation, collaborating with international organizations, strengthening monitoring and enforcement, fostering public-private partnerships, and establishing environmental impact assessment processes, Saudi Arabia can effectively address safety and environmental risks. These measures will not only protect the well-being of its citizens but also contribute to sustainable development and a better future for the country. By prioritizing safety and environmental concerns, Saudi Arabia can ensure a high quality of life for its residents while preserving its natural resources and promoting sustainable growth. Research and innovation in safety and environmental technologies should be supported. Strengthening partnerships between academia, industry and government agencies to develop innovative solutions for risk management, pollution control and sustainable development. Cooperating with international organizations and participating in global initiatives to exchange knowledge and best practices. Participation in international conventions and conventions that address safety and environmental concerns is essential to benefit from shared expertise and resources. Monitoring and enforcement mechanisms must be strengthened to ensure compliance with safety and environmental regulations. Regular inspections, audits, and penalties for non-compliance should be implemented to deter violations and promote responsible practices. It is advisable to encourage cooperation between the public and private sectors to address safety and environmental risks. Partnerships that promote sustainable development, sharing resources, and leveraging expertise to achieve common goals must be strengthened. Robust environmental impact assessment processes for major

development projects must be implemented. This ensures that potential risks and impacts are identified, assessed and mitigated during the planning and implementation phases.

4. First part: Appendixes

4.1. Arabic and English references

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4.2. Appendixes

- Study questions

This study raises many questions of Managing safety and environmental risks in the quality of life in the Kingdom of Saudi Arabia, and these questions will be presented in a main question followed by sub-questions of interest in the same context.

a) The main research question is:

1. How can safety and environmental risks be effectively managed to enhance the quality of life in the Kingdom of Saudi Arabia?

b) Sub-questions for this research are:

1. What are the major safety risks currently affecting the quality of life in Saudi Arabia?
2. What are the major environmental risks currently affecting the quality of life in Saudi Arabia?
3. What are the key factors contributing to safety risks in Saudi Arabia?
4. What are the key factors contributing to environmental risks in Saudi Arabia?
5. What policies and regulations are in place to manage safety risks in Saudi Arabia?
6. What policies and regulations are in place to manage environmental risks in Saudi Arabia?
7. How effective are the existing safety management strategies in Saudi Arabia?
8. How effective are the existing environmental management strategies in Saudi Arabia?
9. What are the potential social and economic impacts of improving safety and environmental management in Saudi Arabia?
10. What are the best practices and lessons learned from other countries in managing safety and environmental risks?

11. What are the potential barriers to implementing effective safety and environmental management strategies in Saudi Arabia?
12. What technological advancements can be utilized to mitigate safety and environmental risks in Saudi Arabia?
13. What are the roles and responsibilities of different stakeholders (government, industries, communities) in managing safety and environmental risks in Saudi Arabia?
14. How can public awareness and education be improved to promote safety and environmental consciousness in Saudi Arabia?
15. How can safety and environmental management be integrated into urban planning and infrastructure development in Saudi Arabia?

- **Survey questions of this study**

• **General questions**

1. Age
2. Sex
3. Degree

• **Main questions**

1. Are you aware of the safety regulations and guidelines implemented by the government in Saudi Arabia?
2. Do you think the government of Saudi Arabia is effectively addressing safety and environmental risks in the country?

3. Have you personally observed any instances where safety and environmental risks were not adequately managed in Saudi Arabia?
4. Do you think there is a need for stricter regulations and enforcement to mitigate safety and environmental risks in Saudi Arabia?
5. Do you believe that public awareness and education about safety and environmental risks in Saudi Arabia are sufficient?
6. Are you aware of any initiatives or programs in Saudi Arabia aimed at managing safety and environmental risks?
7. Are you satisfied with the waste management practices and recycling infrastructure available in your community in Saudi Arabia?
8. Do you believe the government is doing enough to promote renewable energy sources and reduce the dependence on fossil fuels in Saudi Arabia?
9. Have you noticed any improvement in safety and environmental practices in Saudi Arabia over the past few years?
10. Do you think there is sufficient collaboration between the government, industries, and communities in Saudi Arabia to address safety and environmental risks?
11. Do you think sustainability helps reduce health and safety risks?
12. Do you think that legislation and legal regulations can help reduce health and safety risks?
13. Do you believe that increasing medical and cultural awareness can reduce health and safety risks?
14. Can the quality of life in which a community lives be an effective factor in increasing or decreasing the level of health and safety risks?
15. Do you believe that environmental safety can enhance human social and economic life?

16. Can we rely on the laws and legislation of the World Health Organization to reduce environmental health risks?

17. Do you think that the Kingdom of Saudi Arabia is moving steadily in accordance with Vision 2030 towards reducing health and safety risks?

https://docs.google.com/forms/d/e/1FAIpQLSdQcITITNb_VfVH1QMWFa49AgWUDC73goFYmOKIjCv3_B_Lw/viewform

4.3. Arabic abstract

يركز هذا البحث على إدارة مخاطر السلامة والبيئة وأثرها على جودة الحياة في المملكة العربية السعودية. وتهدف الدراسة إلى فهم الوضع الحالي لمخاطر السلامة والبيئة في البلاد وتحديد استراتيجيات لإدارة هذه المخاطر بشكل فعال لتحسين نوعية الحياة.

ولجمع بيانات الدراسة، تم إنشاء استبيان وتوزيعه عبر Google Forms على الأفراد المعنيين بشكل مباشر في الوزارات والهيئات الحكومية والمتضررين من المشاكل البيئية. وتم جمع ما مجموعه 230 ردًا. وسيتم تحليل البيانات المجمعة باستخدام برنامج SPSS ، وهو عبارة عن حزمة إحصائية، لاستخلاص رؤى واتجاهات مفيدة.

وسيوفر تحليل البيانات معلومات قيمة فيما يتعلق بالمخاطر الحالية المتعلقة بالسلامة والبيئة في المملكة العربية السعودية. ستساعد النتائج في تحديد المجالات التي تتطلب اهتمامًا وتحسينًا فوريًا لتحسين نوعية الحياة للسكان. وسيتم عرض النتائج بيانياً ومرئياً لتسهيل فهم أفضل للبيانات.

يهدف هذا البحث إلى المساهمة في تطوير استراتيجيات وسياسات فعالة لإدارة مخاطر السلامة والبيئة في المملكة. ومن خلال معالجة هذه المخاطر، فإن الهدف هو خلق بيئة أكثر أمانًا واستدامة تؤثر بشكل إيجابي على نوعية الحياة العامة لشعب المملكة العربية السعودية.

4.4. English abstract

This research focuses on managing safety and environmental risks and their impact on quality of life in the Kingdom of Saudi Arabia. The study aims to understand the current situation of safety and environmental risks in the country and identify strategies to effectively manage these risks to improve the quality of life.

To collect study data, a questionnaire was created and distributed via Google Forms to directly concerned individuals in ministries and government agencies affected by environmental problems. A total of 230 responses were collected. The collected data will be analyzed using SPSS, a statistical package, to extract useful insights and trends.

Data analysis will provide valuable information regarding current safety and environmental risks in the Kingdom of Saudi Arabia. The results will help identify areas that require immediate attention and improvement to improve the quality of life for residents. The results will be presented graphically and visually to facilitate a better understanding of the data.

This research aims to contribute to the development of effective strategies and policies for managing safety and environmental risks in the Kingdom. By addressing these risks, the goal is to create a safer and more sustainable environment that positively impacts the overall quality of life for the people of Saudi Arabia.