



## HEALTH AND HYGIENE STRATEGIES FOR TOURISM PROMOTION: GUIDELINES FOR AFRICA

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### ABSTRACT

The tourism sector plays a significant role in Africa's economic development. However, African countries are weak contenders in global tourism, hence, it is important to develop mechanisms to elevate the continent tourism performance. The World Economic Forum identifies health and hygiene as one of the 14 pillars necessary to enhance tourism competitiveness. Through the use of literature review approach, this study investigates the tourism related health and hygiene practices utilised by Mauritius and Egypt that contributed to their success story in tourism competitiveness. The findings highlight practices inclusive of; development of health and hygiene policies, regulations and guidelines, enforcement of policy implementations, government funding health related initiatives, and COVID-19 regulations as supportive structures of the two countries' tourism competitiveness. This study further provides short- and medium-term recommendations that could be adopted to improve the health and hygiene environment to support tourism activities.

## 1. INTRODUCTION

Tourism is a dynamic system which is continuously expanding (Uysal, 2022), and its connection to health has been globally recognized since the early nineties (Pan American Health Organization, 1997), and the condition of health and hygiene is key to tourism competitiveness (Msuya, 2015; World Economic Forum, 2019). In recent years, health and hygiene practices are a priority to travellers, and the tourism industry somehow needs to accommodate this changing fact (Lock, 2022). It has been noted that the tourism sector can be significantly affected by disease risks, which in turn affect economic prosperity (Cevik & Goretti, 2020). Severe health risks can arise in locations where the accommodation facilities are of a poor quality, sanitation is inappropriate, medical services are not up-to-date, and clean water is not available (World Health Organization, 2012). These challenges could threaten tourism at such locations, since the state of health and hygiene in destinations play a vital role for tourists' choice of destination (Jovanović, Janković-Milić & Ilić, 2015).

The movement of people for tourism purposes lead to the spread of infectious diseases in geographic areas and populations. Tourists could encounter health related risks especially in areas where accommodation hygiene is compromised (Baker, 2015). Furthermore, international travel continues to grow year by year, and this expose travellers to infectious disease risks because in some destinations, new diseases are emerging while old ones are re-emerging (Brunett, Kozarsky, Magill, Shlim & Whatley, 2009).

The aim of this study is to identify the tourism health and hygiene strategies utilised by tourism best performing African countries. Since 2007, Africa has not been a significant player in the global tourism

market. As a result, it is missing out on the economic benefits brought-forth by the tourism industry. This has been evidenced through the Travel and Tourism Competitive Index (TTCI) reports which indicate the tourism performance of countries through ranking from best to worst performers. As evidenced from these reports, most African countries have been ranking lower than all other countries; mostly ranking in the bottom on average of 135 countries (World Economic Forum, 2007, 2015, 2017, 2019, 2022). Table 1 highlights the African countries' scores from the TTCI between 2017 to 2021.

**Table 1:** African countries scores in the TTCI 2017 to 2021

Year	Number of African countries ranked below the first 50 but above the bottom 30	Number of African countries ranked in the bottom 30	Total number of countries ranked
2021	8	15	117
2019	12	25	140
2017	8	22	136

Adapted from: World Economic Forum (2015, 2017, 2019, 2022)

From Table 1, it can be observed that several African countries are being outperformed in the global tourism industry. These finding highlights that most African countries should consider developing appropriate strategies to elevate their tourism performance.

Health and hygiene have been considered as one of the major pillars contributing to tourism sustainability (World Economic Forum, 2015, 2017,

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2019, 2022). Unfortunately, the World Economic Forum (2019, 2022) indicated health and hygiene as one of the major challenges hindering Africa's tourism performance. This study therefore explores the strategies adopted by two countries which have shown resilience in tourism performance since 2015; Egypt and Mauritius. It is anticipated that the strategies implemented by these two countries in relation to health and hygiene could be adopted by African economies which are underperforming in the tourism sector; mostly those ranking above 100 in the TTCI reports. From these reports, African countries that have been leading in tourism performance are Egypt, Mauritius and South Africa (World Economic Forum, 2015, 2017, 2019, 2022). However, it was noted that South Africa has been dropping in rankings since 2015, while Egypt and Mauritius have been escalating in tourism rankings. In the most recent TTCI, it can be noted that both Egypt and Mauritius outperformed all other African countries, with South Africa further dropping in ranking (World Economic Forum, 2022). Table 2 highlights the three countries' rankings in the TTCI from 2015 to 2021.

**Table 2:** TTCI rankings of Egypt, Mauritius, and South Africa for 2015 to 2021

Country	2015	2017	Change in ranking	2019	Change in ranking	2021	Change in ranking
Egypt	83	74	+8	65	+9	51	+14
Mauritius	56	55	+1	54	+1	62	-8
South Africa	48	54	-4	61	-7	68	-7

Adapted from: World Economic Forum (2015, 2017, 2019, 2022)

It can be observed from the table that Egypt made a significant improvement in rankings up to the year 2021 after the pandemic. Mauritius on the other hand made an improvement from 2015 and 2019; however, it can be observed that it's ranking dropped down from 54 to 62 between 2019 and 2021. Again, South Africa's ranking has declined significantly between 2015 and 2021 (dropping from 48 to 68). Based on this observation, it is evident that even though South Africa and Mauritius rankings between 2019 and 2021 declined, South Africa's performance had been declining from 2015 to 2019, while Mauritius was keeping a steady improvement during this period. These factors formed the rationale behind the selection of Egypt and Mauritius as the two countries to play a key role in this study.

## 2. LITERATURE REVIEW

Access to safe drinking water and sanitation is crucial for the comfort of travellers, and in the event where a tourist becomes sick, the country's health sector should be able to provide proper health care facilities (World Health Organization, 2012). Similarly, the high prevalence of HIV and malaria can have an impact on the productivity of the tourism personnel, and can discourage tourists from visiting any country (World Economic Forum, 2019; Crotti & Mishari, 2015). To exemplify, the Ebola outbreak that affected West Africa in 2014 did affect travelling activities. And to lessen the risk of case importation, many countries and airlines adopted travel restrictions to and from this region. These resulted in the postponement of flights by several carriers, air/sea/land border closings, restrictions for non-

residents, suspension of visa issuance, and entry screening (Poletto, Gomes, Piontti, Rossi, Bioglio, Chao & Vespignani, 2014).

Recognising the connection between tourism and health, the American government in collaboration with the World Health Organization established a subcommittee to examine the topic of health and tourism and propose guidelines to strengthen intersectoral activities and introduce a health perspective into public policies on tourism. The outcome pointed out that the government should prioritize the formation of policies, plans and regulations, public information and training, mobilization of resources, and research (Pan American Health Organization, 1997). On the other hand, using the example of New Zealand, to avoid travellers from spreading unwanted diseases, the New Zealand government established screening processes aimed at identifying ill or potentially ill travellers before they enter the country. The screening takes place in several ways, including screening onboard aircraft or ships, using health declaration forms, visual or temperature screening of traveller, or using rapid laboratory investigation (New Zealand Ministry of Health, 2016). Apart from these, the World Health Organization (2012) indicated that understanding the purpose, the duration of the visit, and the type of travel planned, is essential concerning the associated travel health risks. For example, activities involving going outdoors in the evenings in a malaria-endemic area without taking precautions can lead to infection.

At the beginning of the year 2020, the COVID-19 pandemic emerged as one of the most significant pandemics that disrupted the global tourism industry (Lock, 2022). As the world is facing an unprecedented global health resulting from the COVID-19 pandemic, this factor has also been noted as an impediment to most sectors of the travel and tourism industry with airplanes on the ground, hotels closed, and travel restrictions in all countries (United Nations World Tourism Organization, 2021). It is further estimated that international arrivals are not expected to return to pre-pandemic levels until the year 2024 at the earliest. The pandemic has shown the significance of a country's healthcare system regarding the issue of mitigating the impact of pandemics and guaranteeing safe travel conditions (World Economic Forum, 2022).

Prior to the COVID-19 pandemic, the tourism industry accounted for one in four jobs of all new jobs established globally, 10.4% of the global gross domestic product, international spending amounting to US\$1.7 trillion, 6.8% of total exports, and 27.4% of global services exports (United Nations World Tourism Organization, 2021). However, in the East African Community region only, in 2020, the region lost tourism receipts amounting to US\$4.8 billion as about 4.2 million tourists could not travel to this region. This resulted into a drop from 4.1 million jobs to only 2.2 million jobs in the East African Community region (Muoki, 2021). Again, because of the spread of COVID-19, Asia and the Pacific saw an 82% decrease in arrivals in January-October 2020. The Middle East recorded a 73% decline, while Africa saw a 69% drop in this ten-month period. International arrivals in both Europe and the Americas declined by 68% (United Nations World Tourism Organization, 2020). Taking the Asia-Pacific region for instance, the region had over 360 million

international tourists in 2019, however, due to the global pandemic and border closures, the number of tourists in this region declined to 60 million in 2020 and further down to 20.9 million in 2021 (Ganbold, 2022).

On the other hand, with the spread of COVID-19 decreasing in other regions, travel and tourism slowly started to pick up and accommodation establishments, eateries, and transport began to resume duties. Unfortunately, a second wave resulted into a decline in some parts of the world once more (Kreiner & Ram, 2020). Considering this challenge, countries across the world have started initiating mechanisms to rebuild more resilient tourism economy post COVID-19. These are inclusive of development of plans to support the sustainable recovery of tourism activities and escalating digital transition among others (Organization for Economic Co-operation and Development, 2020).

### 3. METHOD

Research method includes all the procedures and approaches which the researcher has taken to conduct a study (Mishra & Alok, 2011), and these approaches are inclusive of procedures taken for data collection and data analysis to provide undoubted conclusions (Walliman, 2011). This study adopted a literature review approach where secondary data was analysed. Secondary data is data that has been collected by other individuals to gain some background knowledge and understanding of a certain issue (MacDonald & Headlam, 2008). Literature analysis is a good tool to uncover knowledge and guide policy development and practice (Snyder, 2019). A systematic literature review was adopted to guide this study to gain convincing findings. The purpose of a systematic review is to find all empirical evidence that fits the already established criteria to respond to a specific research question, and this method can minimise biasness and lead to reliable findings (Moher, Liberati, Tetzlaff, Altman & Prisma Group, 2009). This study entails a wide range of information and build cases for Mauritius and Egypt to identify best practices to promote health and hygiene in tourism. Systematic literature review is an appropriate method to consider in studies such as case controls, and is normally used when there are numerous studies available to be considered for a qualitative review (Piper, 2013). To ensure trustworthiness, data was collected from numerous sources of information (both international and local sources) such as government and private sector publications, Google Scholar, academic journals, non-governmental organization reports, magazines, and newspapers among others. The collected information was then used to analyse the differences and the similarities of strategies applied by the two benchmarking countries. This was to highlight the common and unique strategies applied by both countries.

### 4. FINDINGS AND DISCUSSIONS

#### 4.1 Case of Mauritius

According to the Mauritius Ministry of Health and Quality of Life (2018a), the government developed a Food Act 1998, which includes Food Regulations. This offers more efficient and effective protection of consumers against health risks when dealing with food that is considered not fit for human consumption

and the risk of public health. Food Regulations in Mauritius have also been designed in accordance with the international norms and standards. Health care is regarded as a basic human right, and the Mauritian government has prioritised its spending in the national budget; for example, from 1969 to 2008, the health budget increased by 12,00 0% (Devi, 2008). To prevent the spread of HIV/AIDS, the Mauritian government with the support from local Non-Governmental Organizations (NGOs) and the private sector, developed a Multi-Sectorial HIV/AIDS framework and its implementation began in 2007 (Ministry of Health and Quality of Life, 2017). Because Mauritius is vulnerable to vector-borne diseases, to fight the occurrence of these, the Mauritian government succeeded to put together all concerned stakeholders ranging from public to private sector, as well as local NGOs to develop measures to prevent and control these diseases. Health detection starts at the port of entry and passengers coming from risky regions are screened by health professionals and the thermal scanner at the airport, and visitors are thereafter followed up to their hotels (Ministry of Health and Quality of Life, 2018b).

Moreover, the country's medical education and training has improved considerably to support its medical tourism, and the Mauritian private health centres have a high standard of care with the facilities supported by modern medical diagnostics centres and laboratories (Tourism Mauritius, 2018). The key strengths in Mauritian water sector are good quality water resources, water supply infrastructure, and relatively qualified personnel for the management of the water supply infrastructure. To support these, the government developed the National Water Policy in 2014 to meet the global water challenges making it possible for the country to accomplish the target under the Millennium Development Goal regarding provision of sanitation facilities. Likewise, the National Sewerage Programme is being implemented to increase the current level of coverage of the public sewerage system from 25% to 75% by 2040 (Ministry of Energy and Public Utilities, 2014). According to Waste Water Authority's last annual report, 2015 witnessed the launching of Phase 1 of the Pailles Guibies Sewerage Project and preparation of the new Framework Agreement for House Connections. Furthermore, seventy-seven private carriers were engaged to improve wastewater management in 2015 (Waste Water Authority, 2015).

In response to the COVID-19 pandemic, the Mauritius government has taken aggressive strategies to keep the tourism industry functioning. According to Mauritius Now (2021) the Mauritian government have opened door for tourists under the following conditions for vaccinated travellers:

- Enjoy a hotel holiday in certified COVID-19 safe hotels;
- Relax in the beach;
- Tourists need a mandatory polymerase chain reaction (PCR) test at the airport on the day of arrival. However, this depends on the length of the stay, as one will also need a PCR test on day seven and fourteen of their stay, and
- After a negative PCR test on day fourteen, tourists are free to go and explore the island.

On the other hand, the Mauritius Now (2021) highlighted that for unvaccinated tourists the following conditions apply:

- A tourist must book a quarantine stay in an official quarantine hotel, which includes meals and transfers;
- One will need to stay in your hotel room for fourteen days and meals will be delivered to their room;
- A tourist shall have a PCR test on the day of arrival, day seven and day fourteen, and
- After a negative PCR test on day fourteen, a tourist can freely explore the island and move to other accommodation establishments.

Hurnath and Dookhony-Ramphul (2021) identified that in Mauritius, tourism players who perceive tourism benefits have a high chance to support the sector in exchange of suitable health measures.

#### 4.2 Case of Egypt

Unfortunately, tourists do suffer from infection and diseases due to failure of hotels to observe food and beverage hygiene. To address this challenge in Egypt, the Department of Health has placed food inspectors in various locations responsible for collecting samples of food from different areas for examination. The food inspectors' other role is to assist tourists' complaints about the food quality whereby the food is expected to be analysed according to the applicable standards and regulations, and legal actions are taken against the accommodation establishment if any violation to the standards are identified, and the injured gets compensated (Youssry & Partners, 2018).

A good health system is a priority to the Egyptian government. According to The World Bank (2018), the bank had funded the government of Egypt with \$530 million to support its objective of improving the country's healthcare system with 600 primary healthcare facilities and 27 hospitals. The project was also intended to screen 20 million adult Egyptians against non-communicable diseases and risk factors. Abdelkader (2014) highlighted that 95% of the Egypt population has physical access to healthcare as the government has extensively invested in healthcare infrastructure. Additionally, unlike other countries in the North African region, Egypt does not face a shortage of qualified medical personnel in all healthcare industry arms. And, as much as water demand is continuously widening because of population growth (Abdel-Shafy & Mansour, 2013), Egypt prides itself on the fact that a high percentage of the population has access to safe water and sanitation (Abdelkader, 2014).

In the wake of the COVID-19 health crisis, Egypt also faced challenges in reopening the borders while maintaining and minimising the health risk of its population. To open doors for tourism activities, the government of Egypt eased guests limits for accommodation establishments,

eateries, cinemas, and theatres to 70% of their capacity from the prior 50% set before as the result of COVID-19 infections decline. This resulted into an increased tourism revenues as the country received about 3.5 million tourists from January to June 2021 (The Arab Weekly, 2021). Other strategies implemented by the Egyptian government and chain-managed five-star hotels in response to COVID-19, include numerous initiatives focusing on policies on health and hygiene, workforce training, marketing, domestic tourism, booking flexibility, cancellation policies, community support, vaccinations, and contracts (Salem, Elkhwesky & Ramkissoon, 2021). The Al Alamain Hotel (2021) indicated that the Egyptian government also developed guidelines and recommendations for hotels to ensure safety and security, and these included:

- Disinfecting the guests' luggage before entering and leaving the hotel;
- Measuring the temperature of guests upon entering and leaving the hotel;
- Providing hand sanitizers in the reception areas and other locations, and
- Upon discovering a positive case among guests, the hotel shall inform the Ministry of Health to coordinate the isolation of the case in the dedicated area in the hotel or hospital based on the severity of the case.

Other measures that the government developed to smooth the activities of tourism while keeping an eye on COVID-19 precautions, were that all arrivals into Egypt, including its citizens, must provide a negative PCR test taken within 72 hours of departure. This extended to 96 hours for arrivals from Japan, China, Thailand, North America, South America, Canada, London, Paris, and Frankfurt. The certificate must be written in English and Arabic and be stamped by an accredited laboratory. All travellers must complete a personal monitoring card and show proof of health insurance on arrival (CNN Travel, 2021).

#### 4.3 Discussions

Table 3 presents an analysis of the similarities and differences of strategies adopted by both Mauritius and Egypt.

**Table 3:** Health and hygiene strategies supporting tourism

Strategies implemented	Mauritius	Egypt
Development of the Food Act	X	X
Development of the water, sanitation and health policies	X	X
Establishment of clean water sector and improved water supply	X	X
Government collaborations with stakeholders to fight the spread of HIV/AIDS and other communicable illnesses	X	X
Improvement of water sewerage system	X	
Increased investment in medical education and training	X	X
Increased budget for healthcare	X	X
Disease detection begins at the port of entry	X	X
Visitors coming from risky disease areas are followed up at their hotel	X	
Improved medical care personnel and facilities	X	X
Securing international financial aid to improve the healthcare system		X
Food inspectors placed in various tourism locations		X
Screening of locals for non-communicable diseases		X
Development of a guiding tool for COVID-19 vaccinated tourists	X	
Development of a guiding tool for COVID-19 unvaccinated tourists	X	
Establishment of certified COVID-19 hotels/guideline for hotels	X	X
Usage of mandatory polymerase chain reaction (PCR) test at the airport	X	
Development of hotel health and hygiene policies to fight the spread of COVID-19		X
Travellers to complete a personal monitoring card and show proof of health insurance on arrival		X
Travellers to provide a negative PCR test taken within 72 or 96 hours of departure depending on the country where the traveller is from		X

The two countries developed the Food Act and water, sanitation, and health policies, established a clean water sector and improved water supply, have established collaborations between government and stakeholders to fight the spread of HIV/AIDS and other transmissible illnesses. Mauritius further improved water sewerage systems. The World Health Organization (2012) highlighted that health risks can increase in places where hygiene and sanitation are of poor quality and clean water is not available. Also, Blanke and Chiesa (2011) considered access to clean drinking water and sanitation as an essential need for tourists. The two countries seem to have invested in medical training and facilities, have increased their health budget, and disease detection begin at ports of entry. In the case where tourists become sick, the country's health sector should provide proper health services, and this is measured by the availability of physicians and hospital facilities (Blanke and Chiesa, 2011; World Economic Forum, 2019). Prior to the COVID-19 pandemic, it appears that Mauritius was already using a strategy of following visitors from risky disease areas up to their hotels. The New Zealand government also used this same strategy prior to the COVID-19 pandemic where potentially ill travellers were screened in aircrafts or ships before they entered the country (New Zealand Ministry of Health, 2016).

Egypt seems to be extending good health and hygiene practices through securing international funding to improve healthcare systems, placing food inspectors in numerous tourism locations, and screening locals for non-communicable diseases. It had been noted that that health risks can increase in areas where the accommodation establishments are of poor quality (World Health Organization, 2012). Also, the findings of Rasethuntsaa (2021), indicated that unhygienic eateries and hotels may lead to tourists' dissatisfaction and tourists would likely not choose the location as their tourist destination in future. Recognising the spread of COVID-19 and its impact to the tourism sector, the two countries developed guidelines for hotels while Mauritius went to the extent of establishing COVID-19 hotel certifications in this regard. Mauritius appeared to have developed measures for treating both vaccinated and unvaccinated travellers while also applying a mandatory PCR test at the airports.

Furthermore, to protect international travellers and its population, Egypt developed a hotel health and hygiene policy, mandates travellers to complete a personal monitoring card and show proof of health insurance on arrival and to provide a negative PCR test taken within 72 or 96 hours depending on the country where the traveller is from. The results of the study also highlight the similarity with the strategies adopted by the United States which included prioritizing the formation of policies, plans and regulations, and mobilization of resources. However, the United States strategies further included an investment in tourism-health research, promoting public information and trainings on the issue of tourism and health, forging ties at the ministerial level among the health, tourism, economic, development and other pertinent sectors in the country, and ensuring the health sector's participation in the feasibility studies and impact assessments of projects to promote tourism (Pan American Health Organization, 1997).

## 5. CONCLUSION AND RECOMMENDATIONS

It can be concluded that the government role in ensuring tourism health and hygiene is through the development of appropriate policies to support and promote a healthy and hygienic tourism sector especially in hotels and eateries. It can also be noted from the results that the two countries are mostly applying the same strategies to promote health and hygiene which in turn has positive spill-over effects on the tourism industry. For example, these include medical human resource development and facilities, and supply of clean water. Collaborations between the NGOs, public- and private sectors is also noted to play a significant role in establishing a healthy and hygienic tourism destination. Egypt and Mauritius are well-informed about COVID-19 strategies to implement in order to ascertain a healthy tourism destination; and a multi-stakeholder approach have been employed to fight the spread of this disease.

In recent years, the world economic outlook is highly uncertain, and sensitive to uncertainties connected to various economic policy decisions emanating from multiple stakeholders inclusive of the government sector (Işık, Sirakaya-Turk & Ongan, 2020). The speedy policy decisions of some economies around the world have effectively allowed the tourism industry to save millions of jobs and livelihoods at risk through retention schemes, and yet, with the industry's contribution to Gross Domestic Product plunging by almost 50% in 2020, the support from government leaders remains more important than ever (World Travel and Tourism Council, 2021). It can therefore be recommended that African countries which lag in this area could adopt the following short- and medium-term recommendations to promote tourism through implementation of health and hygiene measures to emancipate themselves during this declining phase of the tourism industry:

### Short-term strategies

- The government to facilitate establishment of a health and hygiene committee including the government organizations and all tourism stakeholders to keep an eye on health and hygiene trends and challenges affecting the tourism industry. This would enable speedy detection and decision-making on areas of concerns;
- Government to collaborate with health-related NGOs to fight emerging diseases;
- Government to implement health screening in ports of entry even after the eradication of the COVID-19 pandemic as this can be a tool to identify travellers with health issues before they enter the tourism destination;
- Government to develop guiding tool to monitor and handle COVID-19 vaccinated and unvaccinated travellers;
- Government to engage the tourism private sector in the development of guidelines to be utilised during the COVID-19 pandemic as this bottom-up strategy could ensure buy-in; noting the fact that the business sector players are the ones to implement these policies;
- Government to keep an eye on the guidelines provided by the World Health Organization regarding the COVID-19 pandemic and disseminate this information to all tourism stakeholders, and
- Government to form a team that monitors

the implementation of all health policies within the tourism business sector and non-compliers to be penalised. This would enforce compliance towards all health policies, regulations, and guidelines in a tourist destination which in turn would boost tourism competitiveness.

#### Medium-term strategies

- The government through the relevant Ministry to develop food regulations to protect consumers against health risks;
- The government through the relevant Ministry to develop policies for water, sanitation, and health as this would mandate tourism players to implement appropriate measures, and
- Government to increase investment in health education and healthcare facilities as tourists seem to be comfortable in destinations where their healthcare is secure.

This research achieved its intention of identifying strategies applied by both Mauritius and Egypt to promote health and hygiene which ultimately supports tourism effectiveness and competitiveness. The similarities and differences employed by the two countries in this regard were also displayed. The recommendations to other African nations were also presented. Unfortunately, there are no traceable studies that establish the tourism health and hygiene strategies applied in Africa, or a study that compares strategies implemented by African countries to promote health and hygiene to support the tourism sector. This is regarded as an unknown area; therefore, the study is of great importance because it has established a ground for future research in tourism health and hygiene practices in the African continent. Future studies could concentrate on establishing the health and hygiene challenges encountered by tourists in some African countries. The outcome of such a study could enable policy developers and decision-makers to have a thorough knowledge on specific areas that need immediate attention to improve health and hygiene for tourism purposes.

#### Uncertainty and risk

It is acknowledged that because this is a literature review-based research, some critical information regarding the issue under investigation could have been omitted, and therefore compromising the findings of this study due to inaccessible sources of information. Therefore, it is recommended that more empirical studies in this area be explored through the use of other research methods to provide firm conclusions and add more knowledge regarding the topic under investigation.

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