

الآثار المحتملة لجائحة كورونا على التنمية السياحية المكانية في إفريقيا (جنوب إفريقيا دراسة حالة)

جمال عطية

ملخص

هدف الدراسة: تسعى الدراسة إلى رصد الاتجاهات في التغيرات الزمنية لجائحة كورونا في إفريقيا وتحليل أنماطها المكانية والبحث عن الأسباب التي ساعدت على انتشارها في إفريقيا وإجراءات الحد منها. تحديد الآثار السلبية للجائحة على الاستثمار الأجنبي المباشر والنقل الجوي والتحويلات الشخصية للأفارقة المقيمين في الخارج وعلى القطاع السياحي.

المنهجية: اعتمدت الدراسة على المنهج الأصولي والمنهج الإقليمي في الدراسات الجغرافية ومنهج دراسة الحالة، واستفادت من نموذج SIR. واستخدمت بعض التحليلات الإحصائية. كما استخدمت تحليل overlay في برنامج Arc GIS.

النتائج: انتهت الدراسة إلى أن السياحة ستتأثر سلباً بجائحة كورونا من خلال سيناريوهات ثلاثة في حالة استمرار الجائحة حتى 2020 / 2021 و 2022 / 2023 و 2024 / 2025. وسينعكس هذا التأثير السلبي على تراجع عدد السائحين والعائدات والعمالة السياحية خاصة في مصر، وجنوب إفريقيا، والمغرب وتونس وأثيوبيا ونيجيريا.

الخلاصة: كشف تحليل Overlay أن أكثر الدول تأثراً بجائحة كورونا في إفريقيا هي: مصر والمغرب ونيجيريا وجنوب إفريقيا، وأقلها تأثراً دولة أنجولا. وكانت محافظات جوتنج وكوازولونتال والمبوبو والكيب الغربية أكثر المحافظات السياحية تأثراً بجائحة كورونا في جمهورية جنوب إفريقيا.

المصطلحات الأساسية: التغيرات الزمنية - التباينات المكانية- التنمية السياحية المكانية- جائحة كورونا- إفريقيا- جنوب إفريقيا.

Potential Impact of COVID 19 Pandemic on Spatial Tourism⁽¹⁾ development in Africa (South Africa case study)

Jamal Ateyah

Abstract

Objective: the study aim is to examine temporal changes of infection rate and recovery rate, analyze the spatial patterns of these rates and addressing the causes of the COVID 19 pandemic, and determine the potential impact of the COVID 19 pandemic on foreign direct investment, personal remittances, and tourism development.

Methods: The study relied on the fundamental and regional approach in geographical studies and case study approach, benefited from a SIR model. A variety of statistical analyzes and overlay analysis in ARCGIS software.

Results: the study has shown that infection rates are less than recovery rates, and this means they are on the way to recovery. Central Africa was the first region in Africa to recover from infectious levels, COVID 19 is spatially concentrated in the Namibia and Lesotho, Egypt, and Libya.

Conclusion: The study concluded that COVID 19 will have a negative impact on African countries: Egypt, South Africa, Morocco, Tunisia, Ethiopia, and Nigeria. Overlay's analysis revealed that the countries most affected by COVID 19 are Egypt, Morocco, Nigeria, South Africa.

Keywords: spatial tourism development - COVID 19 pandemic- Africa- South Africa.

(1) Spatial tourism development means changes in the geographical distribution of tourism activities and schemes and the linkages between them through the conversion of land and properties.

* Geography Department, College of Higher African Studies, Cairo Univesity, Email: Gamalattia272@yahoo.com

I. Introduction

In December 2019, the world witnessed the emergence of COVID 19 pandemic in Wuhan Province, China, which has since then spread to other continents of the world. The World Health Organization has already declared the pandemic as a Public Health Emergency of International Concern. This pandemic has resulted in 195 million cases and 4.5 million deaths worldwide, including 6.5 million cases and 165,000 deaths in Africa as of July 30, 2021. Hence, it is the topic of the hour and should be researched and examined from a geographical perspective.

A. Study aims

The study aims at examining temporal changes (3 March-18 August 2020) in the trends of infection rates and recovery rates from COVID 19 in Africa and its regions; analyzing the spatial patterns of these rates by addressing the causes of the COVID 19 pandemic in Africa and the ways in which it decreased; and determining the potential impact of COVID 19 pandemic on spatial development by identifying certain impacts on foreign direct investment, personal remittances and tourism development in Africa and the Republic of South Africa as a case study.

B. Study notion

The study monitors and tracks the Corona pandemic in terms of quantity and quality, as well as temporally and geographically. Tourism is examined quantitatively and qualitatively at many geographic scales to identify the negative consequences of the Corona pandemic on the present and future of spatial development tourism in Africa and the Republic of South Africa, with the continuation of COVID19 pandemic according to scenarios.

C. Previous studies:

- **(Zhong et al., 2020A).** Early Prediction of the 2019 Novel COVID 19 Outbreak in the Mainland China Based on Simple Mathematical Model. This paper made an early prediction of the COVID 19 outbreak in China based on a simple mathematical model susceptible, the infected population and the removed infective (SIR Model) and limited epidemiological data.

- **(Waqas, M. A., 2020B).** Analysis and Prediction of COVID-19 Pandemic in Pakistan using Time-dependent SIR Model. This study conducted statistical and numerical analyzes to arrive at credible and precise outbreak forecasts in Pakistan. The Susceptible-Infected-Recovered (SIR)

model, which depends on time, was used to fit the data and provide future predictions.

- **(Lin et al., 2020C)**. A Conceptual Model for the Coronavirus Disease 2019 (COVID-19) Outbreak in Wuhan, China with Individual Reaction and Governmental Action. This paper suggested conceptual models for the COVID-19 outbreak in Wuhan taking into consideration human behavioral reaction and governmental decisions, such as holiday extension, travel ban, hospitalization, and quarantine. It used the predictions of these main components from the London, United Kingdom influenza pandemic of 1918, integrated zoonotic introductions and emigration, and then estimated future trends and reporting ratio.

- **(Kuniya, 2020D)**. Prediction of the Epidemic Peak of Coronavirus Disease in Japan, 2020. This study aimed to provide a forecast of the COVID-19 outbreak peak in Japan using real-time data from January 15 to February 29, 2020. Considering the uncertainty arising from the incomplete identification of the infectious population, the well-known SEIR compartment model was applied to the prediction.

- **(Morsy & Al sady, 2020E)**. The Consequences of the Emerging COVID 19 Crisis on Egyptian Tourism Industry. The study examined the economic significance and growth of the Egyptian tourism sector during the period 2010-2020, the influence of the recent outbreak of the COVID 19 on global and Egyptian tourism, Egypt's efforts to handle the effects of the COVID 19 pandemic, planned scenarios and proposals to mitigate the effects of the COVID 19 on tourism.

- **(Soliman, 2013)**. New Corona Virus Middle East Respiratory Syndrome: A Study in Medical Geography. The study addressed the origin and source of the corona virus, trends of its spread, predictions, causes, methods of spread, related environmental hazards, resulting human losses, strategies, and methods to fight it.

D. Hypotheses:

1. COVID 19 infection rates and recovery rates vary dramatically between African countries.
2. COVID 19 has spread extensively in Africa but at lower rates than in Europe and North America.

3. COVID 19 is harmful to the tourism development and various development sectors in Africa.

II. Methodology and Data Sources

The study relied on the fundamental and regional approach in geographical studies and case study approach and benefited from the Susceptible-Infected-Recovered SIR model⁽¹⁾. A variety of statistical analyzes, such as spatial concentration index, infection rate, recovery rate, were used as well as overlay analysis - weighted sum tools in ARCGIS software.

$$\text{- Growth Factor} = \frac{\Delta Nd}{\Delta Nd-1}$$

- Recovery Rate = the ratio of the new removed number to the new number of the infective. (Zhong, et al, 2020:763)

- Spatial Concentration Index = $\frac{\text{infectious cases in Africa}}{\text{recovery number in Africa}} \div \frac{\text{infectious cases in State}}{\text{recovery number in State}}$
(Vogiatzoglou, & Tsekeris, 2011:12-13) modified.

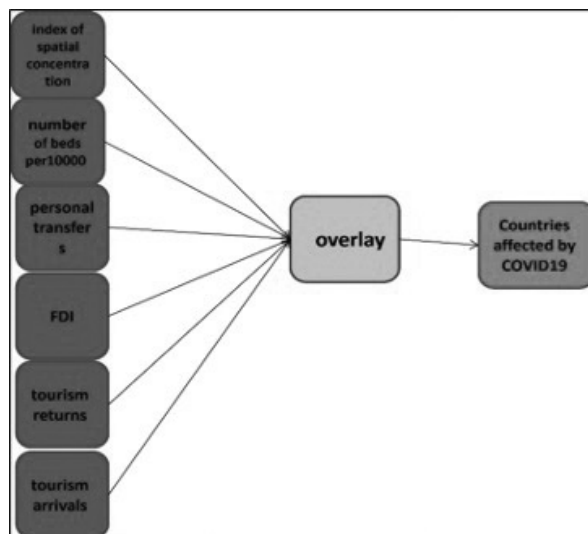
Tourism Power Coefficient, % variable X number of governorates in which the activity is distributed, then with the rest of the variables this is achieved, and then the power of the variables is gathered and divided by their number.

Using Overlay Technique – weighted sum, spatial variables, and their relative weights table (1)

	Health variables		development variables		Tourism variables		
Variables	index of spatial concentration of COVID19	Number of beds per 10000	personal transfers	FDI	Tourism returns	tourist arrivals	total
Weights	15%	15%	16%	17%	19%	18%	100

(1) The SIR model relies on two adjustable parameters $\beta(t)$ measuring transmissions per unit time and $\gamma(t)$ measuring recoveries per unit time. The accurate calculation of these will estimate a fair number of infections and the pandemic peak. The exponential fit is used to estimate their data values, and then to forecast future trends (Waqas, 2020:2).

Figure (1) Overlay schematic of potential impact of COVID 19 on tourism development in Africa.



Data Sources:

- African Union & Africa CDC (Center for Diseases Control and Prevention), (2020). Outbreak Brief Reports No. 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 80.
- World Health Organization (WHO). Situation Report, No, 183, 21 July 2020, COVID 19.
- African Development Bank (2020). African economic outlook, supplement, amid COVID19 and African statistical yearbook (2019). World Bank (2020), World Development Indicators, World Bank data stat.
- Organization of Economic Cooperation and Development Reports (OECD), (2020). Impacts of COVID 19 and Revenue statistics in Africa Report (2019).
- United Nations of Tourism World Organization Reports (UNTWO), (2020).
- World Travel and Tourism Council Reports, (2020). (WTTC) Recovery Scenarios, 2020 & economic impact from Covid19.
- World Investment Report and How COVID 19 is changing the world: A statistical perspective.

- United Nations Development Program (UNDP), (2019). Human Development Report.
- International Civil Aviation Organization (ICAO) Report, (2021). Effects of Novel Coronavirus (COVID-19) on Civil Aviation.
- The International Air Transport Association (IATA) Report, (2020).

III. Results

- Temporal changes and spatial differentiations of COVID-19 in Africa

On 3rd March (YEAR), the only countries that reported persons under investigation (PUIs) with a positive test for SARS-COVID-19 were Algeria (3), Egypt (1), Morocco (1), Nigeria (1), Senegal (1), and Tunisia (1). (African Union & Africa CDC, 2020:2-3).

The nationalities that transferred COVID-19 to Africa were visitors from Italy, France, and Canada. The infection rate of COVID-19 in Africa ranged between 0.15-0.77, in a general trend towards decline (first wave). This decline meant a decrease in cases associated with infected cases. Whereas the recovery rate ranged between 0.007 and 0.09, which meant that 7 persons recovered per thousand in the first case and 97 people per 1000 in the second case (Fig.2). When the recovery rate for a country exceeds the infection rate, this is evidence that the country is on the way to full recovery. The rates of infection and recovery for COVID-19 varied across African regions, as shown in (Fig.3) and (Fig.7) below.

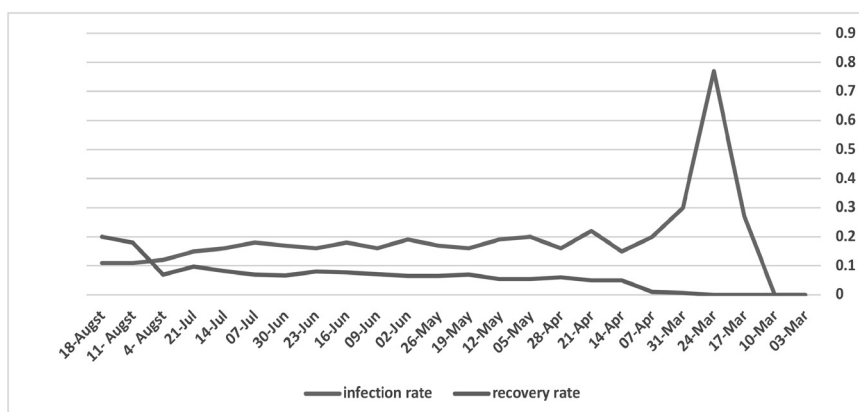
Regarding the relationship between COVID-19 infection rates and recovery rates in African regions, it is noted that the gap between them is narrowing in a general trend, and recovery rate exceeded infection rate on 11th August 2020. Recovery rates in the Central African regions have surpassed infection rates for COVID-19; this means that the countries are on the path to recovery with tightened precautionary steps. The turning point of the peak of the pandemic is defined as the day when the transmission or infection rate becomes less than the recovering rate (Waqas et al, 2020:1). In Central Africa, the pandemic peak turning point was on June 30th, 2020, as shown in (Fig.3).

There was still a gap in COVID-19 infection rates and recovery rates, but it was also decreasing in the regions of East Africa and South Africa, despite the great variation in the number of reported infections and

the number of recovered persons (Figs.4, 5). The gap between infection rates and recovery rates widened due to the large increase in the number of infected persons, particularly in the Republic of South Africa, which recorded the highest number of infections: 394 thousand cases, which was more than half of the cases in the entire African Continent then; infection cases rose over 2.3 million on July 30th, 2021, as a result of the increase in the number of swabs and tests, which amounted to 2.5 million tests at a rate of 6.5 tests/case (African Union & Africa CDC, 22 July, 2020). However, the rate of recovery surpassed the rate of infection in eastern Africa on 11 August and on 18 August (YEAR)in South Africa (first wave).

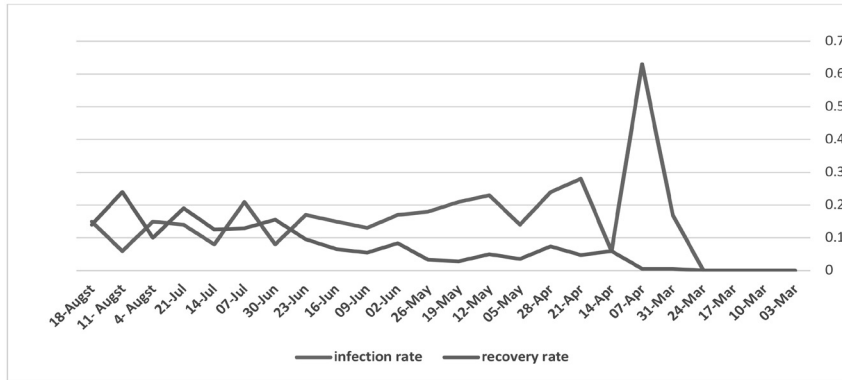
In northern and western Africa, the gap between infection rates and recovery rates of COVID-19 narrowed down so that infection rates were nearly equal to recovery rates. The narrow gap arose from the increase in the number of people recovering and the decrease in infections in the north African region in Tunisia, Morocco and Algeria, and the increase in recoveries in Ghana, Côte d'Ivoire, and Guinea in West Africa (Figs.6 & 7).

Figure (2). Rate of daily infection and recovery trends for Africa from March 3rd to August 31st, 2020.



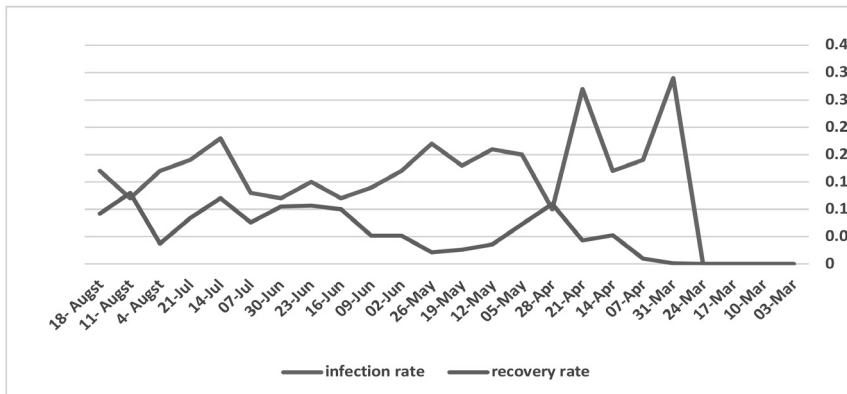
Source: Author's calculation is based on African Union & Africa CDC, 2020, Outbreak Brief Report No. (4) to Outbreak Brief Report No. (31): Novel Coronavirus (COVID-19) Global Epidemic, Addis Ababa.

Figure (3). Rate of daily infection and recovery trends for Central Africa region⁽¹⁾ 3 March -18 August, 2020.



Source: Author's calculation is based on African Union & Africa CDC, 2020, Outbreak Brief Report No. (4) to Outbreak Brief Report No. (31): Novel Coronavirus (COVID-19) Global Epidemic, Addis Ababa.

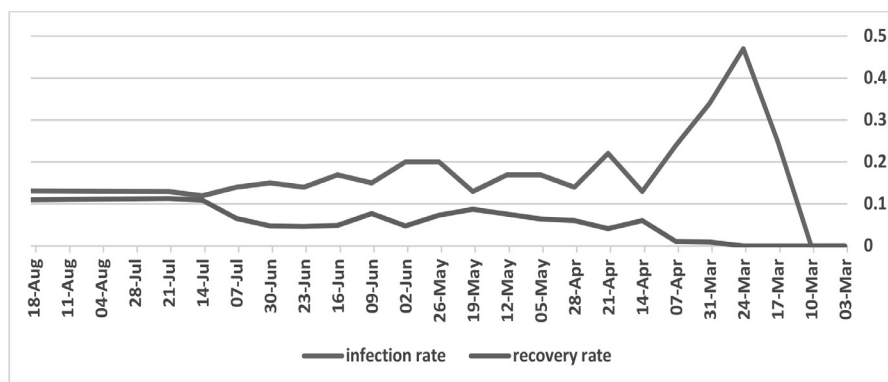
Figure (4). Rate of daily infection and recovery trends for Eastern Africa region⁽²⁾ 3 March-18 August 2020.



Source: Author's calculation is based on African Union & Africa CDC, 2020, Outbreak Brief Report No. (4) to outbreak brief Report No. (27): Novel Coronavirus (COVID-19) Global Epidemic, Addis Ababa.

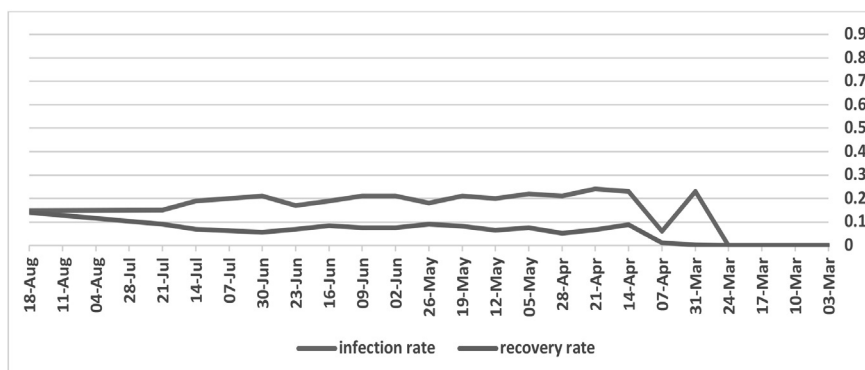
- (1) Central African region, including: Burundi, Cameroon, Central African Republic, Chad, Congo, DRC, Equatorial Guinea, Gabon and Sao Tome and Principe.
- (2) East African countries, including: Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Rwanda, Seychelles, Somalia, South Sudan, Sudan, Tanzania and Uganda.

**Figure (5). Rate of daily infection and recovery trends for Northern Africa region⁽¹⁾
3March -18 August, 2020.**



Source: Author's calculation is based on African Union & Africa CDC, 2020, Outbreak Brief Report No. (4) to Outbreak Brief Report No. (27): Novel Coronavirus (COVID-19) Global Epidemic, Addis Ababa.

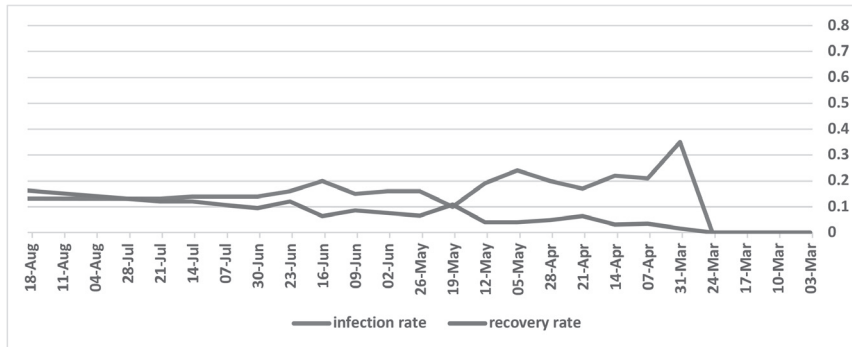
**Figure (6). Rate of daily infection and recovery trends for Southern Africa region⁽²⁾
3March-18 August 2020.**



Source: Author's calculation is based on African Union & Africa CDC, 2020, Outbreak Brief Report No. (4) to Outbreak Brief Report No. (27): Novel Coronavirus (COVID-19) Global Epidemic, Addis Ababa.

- (1) North Africa region, including: Algeria, Egypt, Libya, Mauritania, Morocco and Tunisia.
- (2) Southern Africa countries, including: Angola, Botswana, Eswatini, Lesotho, Malawi, Mozambique, Namibia, South Africa, Zambia and Zimbabwe.

**Figure (7). Rate of daily infection and recovery trends for Western Africa region⁽¹⁾
3March-18 August 2020.**



Source: Author's calculation is based on African Union & Africa CDC, 2020, Outbreak Brief Report No. (4) to Outbreak Brief Report No. (27): Novel Coronavirus (COVID-19) Global Epidemic, Addis Ababa.

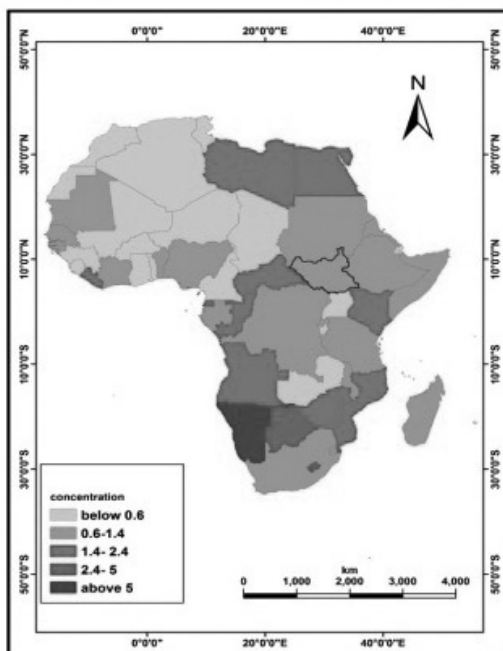
3. It is noted from Figure (8) that the countries reported the highest spatial concentration index of more than 5 COVID-19 are Namibia, Botswana, and Lesotho in the South African region, which are countries with fewer people recovering in relation to the number of infected people. This may be due to the fact that the virus of AIDS is endemic in these countries and the symmetry of recovery is difficult.

There are countries with a high concentration of COVID-19, such as Egypt and Libya in North Africa, which may be due to the small number of swabs and tests in the case of Egypt and the civil war between the western region and the eastern region in Libya. The prevalence of malnutrition and malaria also induces large concentrations of COVID-19 in the countries of Angola, Equatorial Guinea and Central Africa.

On the other hand, there is a slight degree of concentration in Algeria, Tunisia, and Morocco in North Africa, and in Niger, Mali, and Burkina Faso in the West African region due to the rise in the number of people recovered compared to those infected, and to the strict precautionary measures taken.

(1) Western Africa region, including: Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

Figure (8). Spatial concentration index for COVID-19 in African States on 14 July 2020.



Source: Author's calculation is based on African Union & Africa CDC, 2020, Outbreak Brief Report No. (26) 14 July 2020.

IV. Analysis

A. COVID-19 and Development in Africa

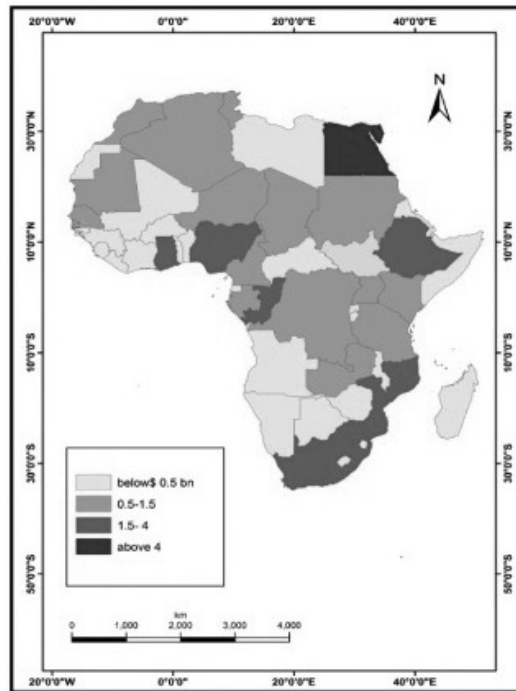
1. Foreign Direct Investment

Since 2016, Foreign Direct Investment (FDI) has been on a downward trajectory and is expected to decline sharply because of COVID-19 pandemic and the resulting supply disruptions, demand contractions and economic actors' pessimistic outlook. Also, in the most optimistic scenario – in which the economy begins to recover in the second half of 2020 – FDI flows are expected to decline by more than 30% compared with 2019, and it could drop by 40% from \$1.5 trillion to \$1 trillion (UNCTAD, OECD 2020:2).

Furthermore, large-scale capital withdrawals from the continent have already occurred; in early March (YEAR), for example, the All-Share Index reported its worst performance for a decade in Nigeria as outsourced

investors. Experts estimated that Africa could lose up to 15 percent of the continent's FDI inflows, which amounts to approximately \$6.9 billion.

Figure (9). Value of foreign direct investment inflow to African States 2019.



Source: Author's data is based on UNCTAD, B, World investment Report, 2020:238-239.

In 2019, FDI inflow to Africa was \$45.368 billion, and the top five FDI recipient countries were: Egypt (\$9 billion, +10.7% from energy activities), South Africa (\$4.6 billion, -15.1% from mining & manufacturing activities), Congo (\$3.4 billion, -22% from energy), Nigeria (\$3.3 billion, -48.5% from energy), and Ethiopia (\$2.5 billion, -24% from energy & manufacturing activities) (Fig.9). Foreign direct investment flow into these countries will be negatively impacted by the COVID-19 pandemic (World Investment Report, 2020:28).

2. Personal Remittances

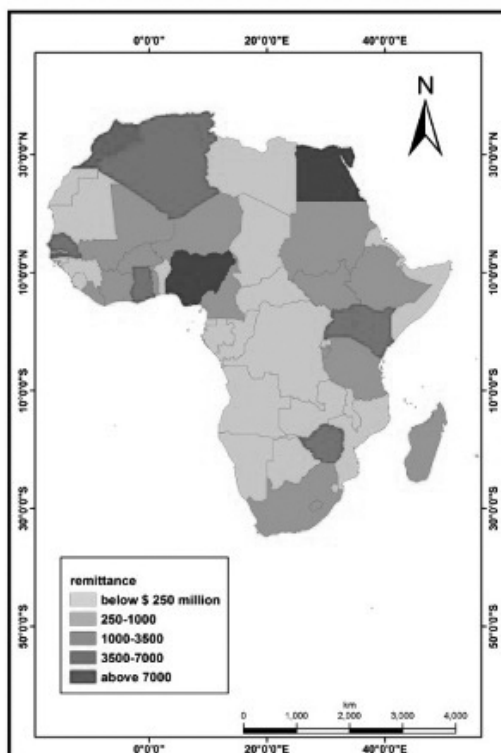
Despite the US dollar appreciation caused by COVID-19 partly counteracting these effects, the World Bank (2020) projects that remittances to developing countries would be reduced by 20% compared with 2019. The key reason for this impact is that the sending countries suffered

severe economic blows that translated into lower incomes for remittances transferred by individuals (OECD, 2020:9).

Remittances have been Africa's largest source of international financial flows since 2010, accounting for approximately one third of total external financial inflows. Total African remittance of \$100 billion in 2019 will subsequently witness substantial decreases that could reach \$15 billion (i.e., almost 20%) (AUC&OECD, 2019:33).

Remittances as a share of GDP exceed 5% in 13 African countries, ranging from 23% in Lesotho to over 12% in the Comoros, Gambia, and Liberia (African Union, 2020: 18). Taken together, the largest economies in Africa, Egypt (\$26.7 billion) and Nigeria (\$23.8 billion), account for 60% of Africa's remittances (World Bank data, 2020) (Fig.10).

Figure (10). Value of personal remittance for African States (2019).



Source: Author's data is based on <http://datatopics.worldbank.org/world-development-indicators/themes/global-links.html#migration-and-personal-remittances>, July, 2020.

B. COVID 19 and Tourism

Air Transport

The International Air Transport Association (IATA) announced air passenger traffic data for March 2020, which showed a decrease in demand (which is measured based on the revenue of one traveler per km) by 52.9% compared to the same period of the year 2019, recording the largest decrease in the sector's history because of the government's measures to minimize the spread of COVID-19 (IATA, 2020:1).

IATA estimates that the Air Transport industry's economic contribution in Africa amounts to 55.8 billion US dollars, supporting 6.2 million jobs and contributing 2.6% of GDP. These restrictions imposed on Air Transport Industry have affected international airlines including African giant Ethiopian Airlines, Egypt Air, Kenya Airways, South African Airways, and many others. The first impact reflected on the airlines staff who became partially redundant. In normal times, however, airlines transport makes around 35% of the world's trade, and each job in air transport supports 24 other jobs in the value chain of travel and tourism, creating around 70 million jobs.

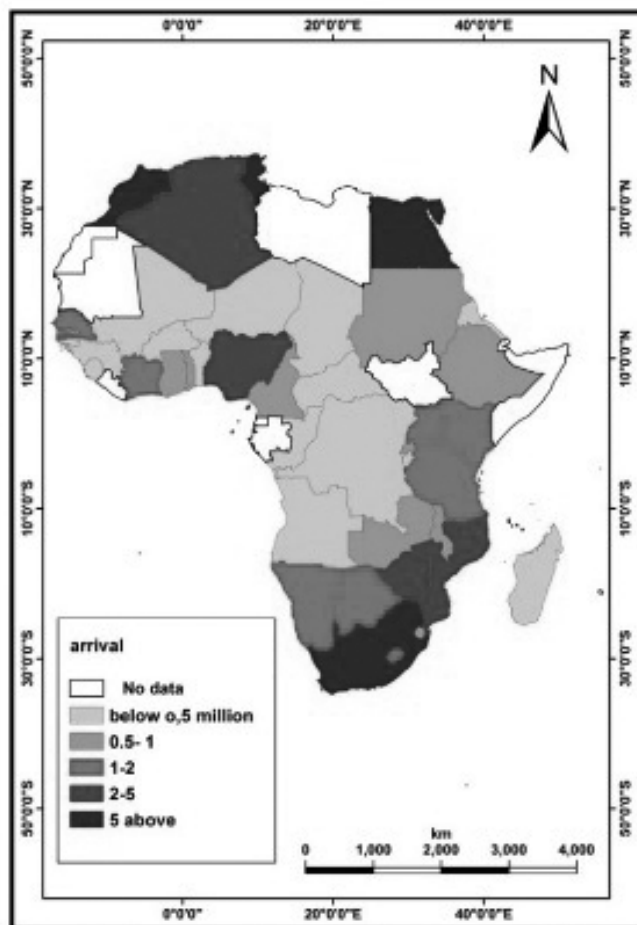
According to the latest results, ticket refunds in 2020 increased by 75% compared with the same period in 2019 (01 February-11 March). According to the same results, African airlines have already lost revenue of 4.4 billion US dollars by 11 March, 2020 (African Union, 2020:14).

Among the estimated effects of COVID 19 on international aviation in Africa are the following: decreased seat capacity by -47% to -68%, lowered passenger numbers by -52 million to -62 million, and reduced revenues by -\$10 to -\$13 billion. Also, COVID-19 is expected to have an effect on domestic air travel in Africa: seat capacity is reduced by -47 to -58%, passenger numbers are decreased by -24 to -29 million, and revenue is lowered by \$ -2 to \$ -3 billion (International Civil Aviation Organization, 2020:10-11).

The most attractive African countries to the international tourist arrivals are Egypt, South Africa, Morocco, Tunisia, Algeria, Ethiopia, Nigeria and Tanzania; these countries were negatively impacted by the COVID 19 pandemic as tourism development plays an important role in boosting the economies of these nations (Figs.11, 12). In countries such as

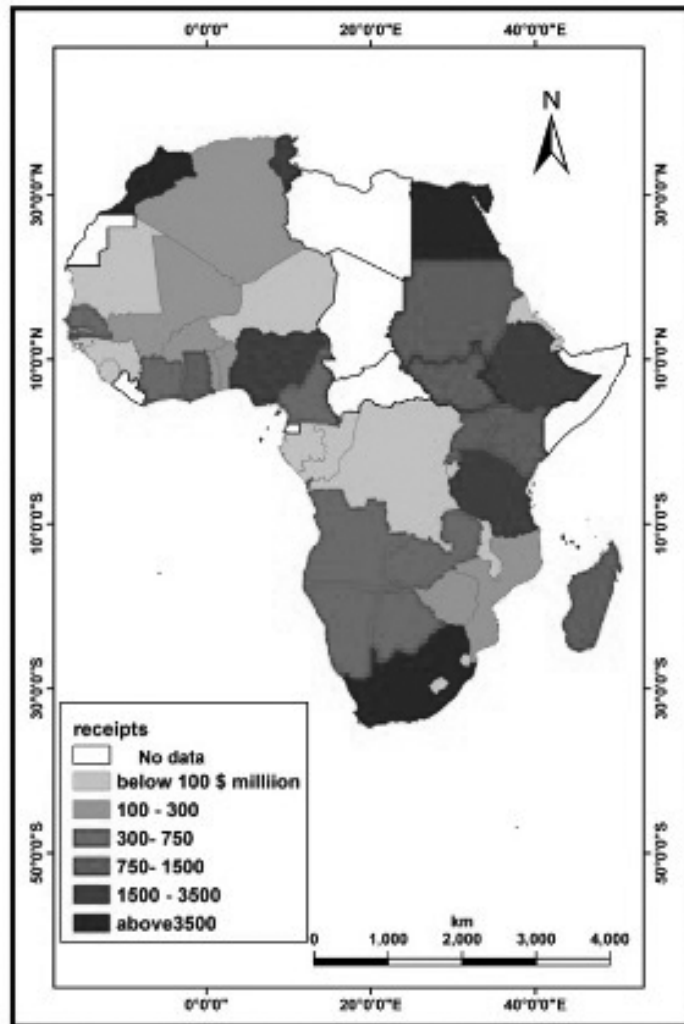
Seychelles, Cape Verde and Mauritius (tourism forms about 25% of GDP). The tourism sector employs more than a million people in each of the following countries: Nigeria, Ethiopia, South Africa, Kenya, and Tanzania. Tourism employment comprises more than 20% of total employment in Seychelles, Cape Verde, São Tomé and Príncipe, and Mauritius (African Union, 2020:15).

Figure (11). Number of international tourist arrivals to African States (2018)



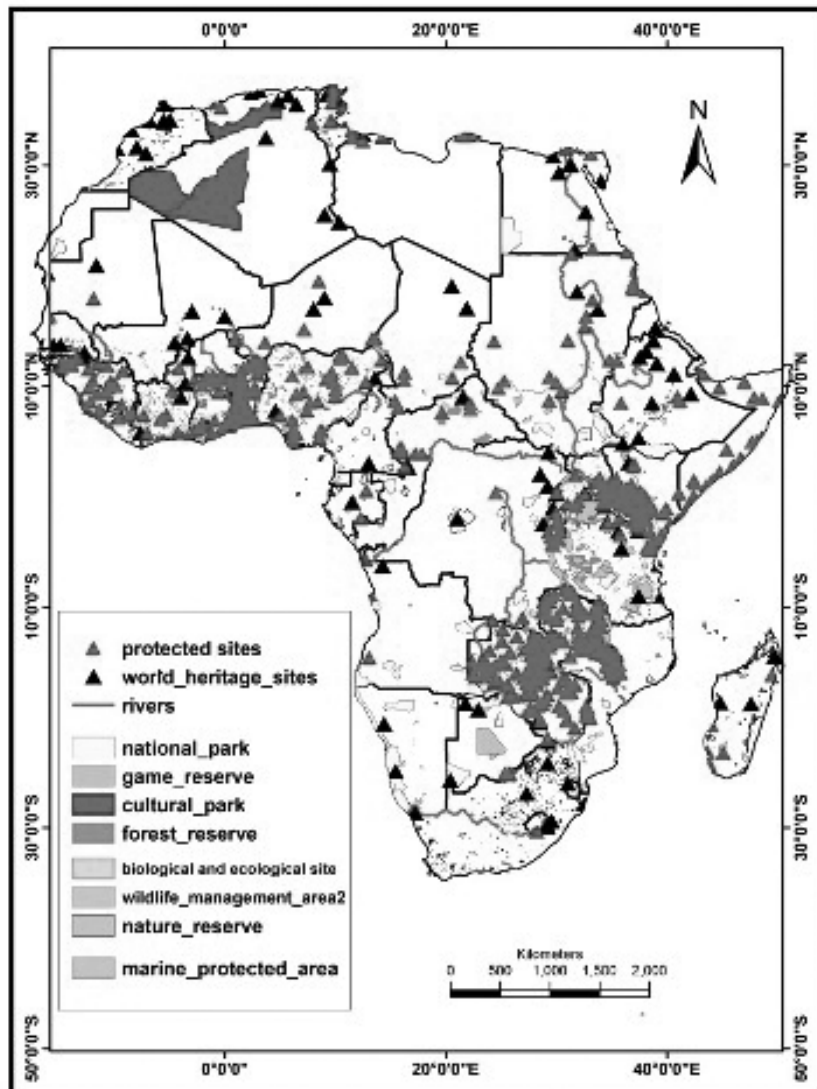
Source: Author's data is based on World Bank, World Development Indicators, 2020 available at <https://data.worldbank.org/indicator/ST.INT.ARVL>, July, 2020.

Figure (12). Value of international Tourist Receipts in African States (2018)



Source: Author's data is based on World Bank, World Development Indicators (2020), available at <https://data.worldbank.org/indicator/ST.INT.RCPT.CD>, July, 2020.

Figure (13). Tourism of protected areas and world heritage sites in Africa (2020).



Source: Author's data is based on protected planet, 2020, UNESCO.2020.

Africa has 8,559 protected areas comprising 4217 forest reserves, 1487 nature reserves, 467 national parks, 413 Ramsar site wetland of international importance, 164 wildlife reserves, 101 biological and ecological sites, and 82 game reserves. These wildlife and safari tourism sites are concentrated in eastern and southern Africa, while cultural heritage

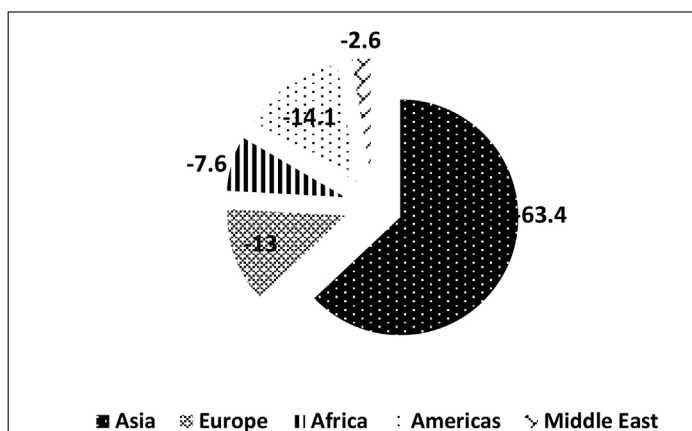
tourism sites prevail in West Africa, especially in Ghana, Mali and Senegal (World bank, 2013:55-58); there are 182 World Heritage sites: 131 cultural, 43 natural and 8 mixed. World Heritage tourism sites spread in the North African countries of Egypt, Tunisia, and Morocco (Fig.13). Consequently, these tourism patterns and coastal tourism sites that spread in Africa and attract most of the inbound tourism, will be drastically affected by the Corona virus pandemic. North African tourism may be impacted more than that of Sub-Saharan Africa, because the former relies on 80 percent of its markets outside Africa, while the latter receives two-thirds of its international arrivals from Africa (UNCTAD, 2017:101). Number of international tourist arrivals decreased by 4-% during the global economic crisis in 2009, by 0.4- % in 2003 due to the SARS outbreak, and by 0.1% in 2001 after the attacks of September 11th (UNWTO, 2020A:6). Global tourism is one of the economy sectors that has been most impacted by COVID-19 pandemic. Due to COVID-19, the United Nations World Tourism Organization (UNWTO) predicts a loss of 850 million to 1.1 billion international tourist arrivals, \$910 million to \$1.1 trillion in export revenue and 100-120 million jobs, depending on scenarios whether the borders are open in July, September or December (2020) as shown in table 2. (UNWTO Website, 2020B).

Table 2.

WTTC Scenarios of Tourism Recovery for Africa, 2020

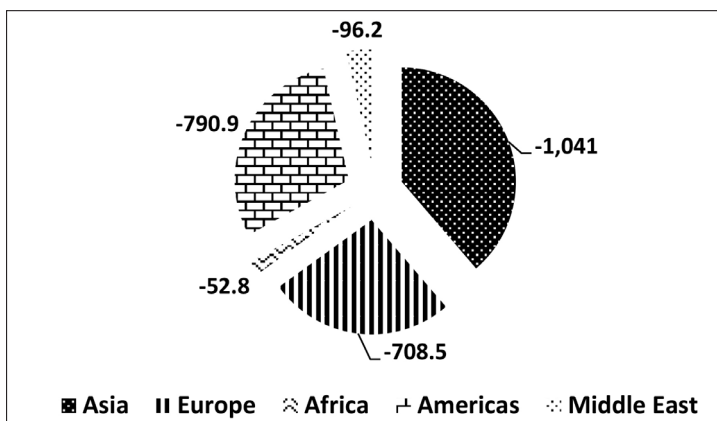
Variables	Best case scenario	Baseline scenario	Worst case scenario
* Tourism job losses	* 7.6 million	* 10.9 million	* 17.4 million
* tourism GDP loss	* \$ 53 billion	* \$ 75 billion	* \$120 billion
* Visitor arrivals fall	* 36% international, 22% domestic	* 50% international, 35% domestic	* 71% international, 66% domestic

Source: WTTC, 2020B, recovery scenarios, 2020 & economic impact from Covid-19, London. Available at <https://wttc.org/Research/Economic-Impact/Recovery-Scenarios-2020-Economic-Impact-from-COVID-19>

Figure (14). Potential of Total Job losses in Tourism, World, 2020 (million)

Source: Author's data is based on World Travel Tourism Council (2020:2)

The WTTC has warned about the severity of the crisis, about 75 million of the 100.8 million workers are at risk in G20 countries, 7.6 million jobs are lost in Africa (Fig.14). In Africa, the world's smallest regions have lost GDP tourism receipts. Losses from a total of \$2.7 trillion are calculated at \$52 billion, (1.9%) (Fig.15).

Figure (15). Potential of Total GDP Loss in Tourism, World, 2020 (billion\$)

Source: Author's data is based on World Travel Tourism Council (2020:2)

On May 6, 2020, five international air and tourism organizations called on international financial institutions, country development partners and international donors to support the African travel and tourism sector, which employs some 24.6 million people around the African Continent.

The COVID-19 crisis will cause the industry to collapse in Africa without emergency funding, which may result in the loss of millions of jobs. The sector is contributing \$169 billion to the African economy, which represents 7.1% of the Continent’s GDP (Fig. 15) (IATA, 2020:1).

According to the World Travel and Tourism Council’s scenarios, international tourism to Morocco, Egypt, South Africa, Tunisia, and Algeria will decline by 36% during 2020-2021, which is the best scenario. If the pandemic lasts until 2022-2023, which is the moderate scenario, international arrivals will drop by 50%. If the pandemic continues until 2024-2025, the worst-case scenario will show over 71% drop (Fig.16).

Figure (16). Potential Impact of Corona Virus on International Arrivals for Selected African Countries (2018-2025) (million visitors).

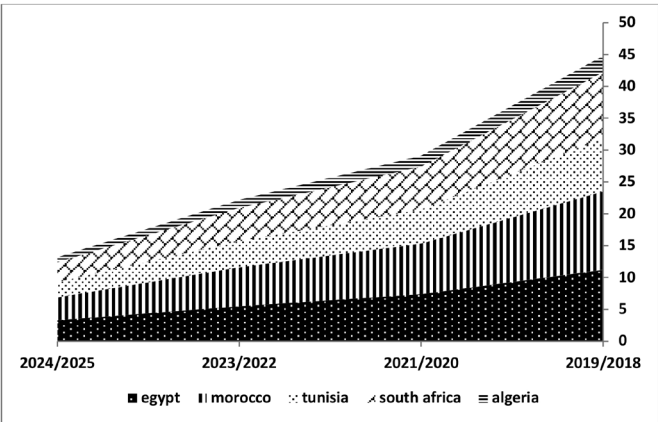
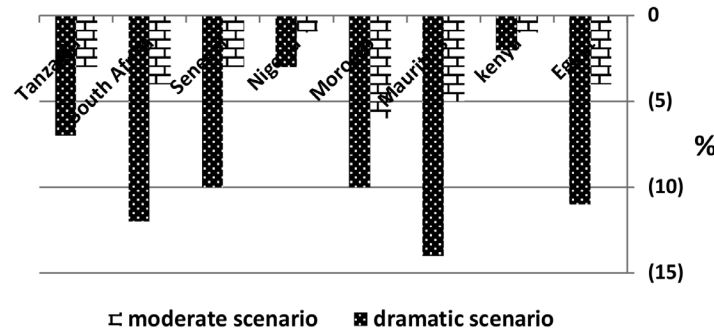


Figure (17). Change in Tourism Unskilled Labor in Selected African States, 2020



Source: Author’s data is based on the United Nations Conference on Trade and Development, (2020:24-25).

For unskilled workers, the resulting level of unemployment is seen in (Fig.17) above. The badly affected countries are Mauritius, South Africa, Egypt, and Morocco. In the most extreme case, employment will fall by 14% in Mauritius if the entire tourism sector is locked down for 12 months. The case in Mauritius is extreme due to a high share of unskilled workers in its tourism industry, and the big contribution of the industry to the country's GDP. High unemployment shall result in significant losses in GDP. It can be expected that other African States reliant on tourism shall face similar dramatic challenges in the labor Market.

V. Discussion

1. COVID-19 Diffusion causes

There could be several factors underlying the fast spread of the 2019-nCoVid; one factor at the early stage of the epidemic outbreak could be the lack of clarity in details. For the public's anti-disease response, it is extremely important to release the information about the disease in a timely and reliable way; authentic and transparent information could have prohibited the spread of the COVID 19 at the early stage. Another factor could be the lack of scientific diagnostic criterion for the COVID 19; rapid development of exact testing techniques for a novel virus is very challenging.

Since COVID-19 symptoms are very similar to those of the regular flu, diagnosis became much more challenging. In addition, the absence of an outbreak warning and prediction program diminished the ability to ban the spread of the outbreak at the initial stage (Zhong, et al, 2020:51762).

A further factor that played a major role in the spread of the COVID 19 pandemic was the continued movement of air transport, tourism and business between China, the epicenter of the pandemic, and the rest of the world, including African States, after the outbreak of the pandemic for more than 50 days from December 2019 until mid-February 2020. North America was responsible for 35.7% of global air traffic, followed by Asia (25.2%), Europe (17%), and Africa (3.4%) (ICAO.2020:2). This explains why infection rates were high in America, Asia, and Europe, but low in

Africa, because air travel was one of the most significant factors in the global spread of the virus.

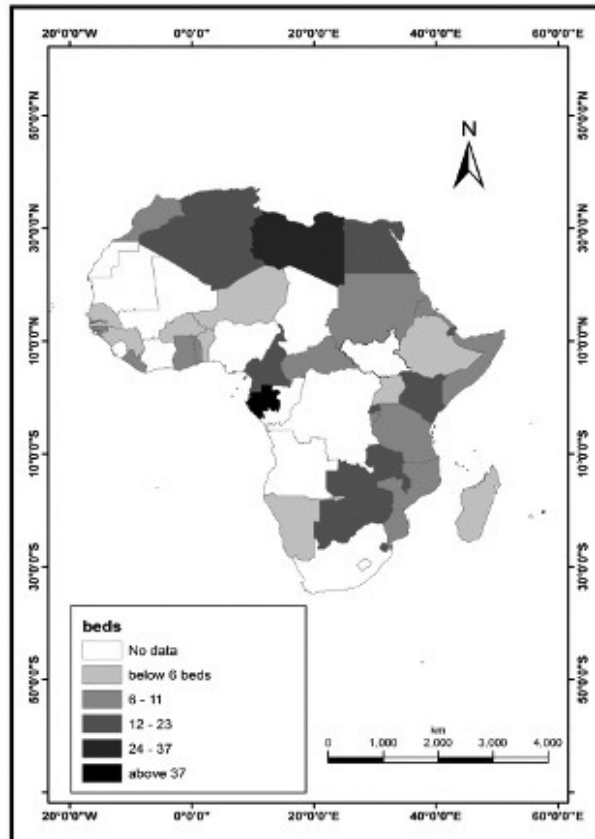
According to the WHO estimates, out of the 3.6 million–5.5 million COVID-19 hospitalization cases, there were about 82000–167000 severe cases that required oxygen, and about 52000–107000 critical cases that required breathing support. The WHO also stated that the predicted number of hospitalization cases in most of Africa was overwhelmingly beyond the available medical capacity (OECD B, 2020:4).

Accordingly, the results of the reports from the African Union showed that infection was transmitted to African countries through 39 African States; the source of infection was within the reporting location (local infection) and 12 states were infected by external transmission where all cases had been acquired outside the reporting location: South Sudan, Chad, Gabon, Angola, Mauritania, Sierra Leone, Benin, Guinea-Bissau, Botswana, Gambia, Cape Verde and Seychelles (African union & Africa CDC, 5 April, 2020).

Suffering from malaria, AIDS, Ebola, Malnutrition diseases and schistosomiasis diseases, the African Continent find it difficult to detect corona virus antibodies and reduce the body's immunity. The hot climate in the tropics with poor health services lead to corruption or inadvertent contamination of blood samples and inaccurate results (El bana & Ghabbour, 2015:645).

The United Nations Economic Commission for Africa (UNECA) projects that a one-month full lockdown across Africa will cost the continent about 2.5% of its annual GDP (USD 65 billion). Implementation of these measures is particularly problematic in Africa because of high levels of poverty and informality. One in three Africans (441 million people) lives at USD 1.9 a day below the global poverty line. The vast majority of the population in most African countries is self-employed in the informal sector and may not be able to afford self-isolation (OECD, 2020 B: 3).

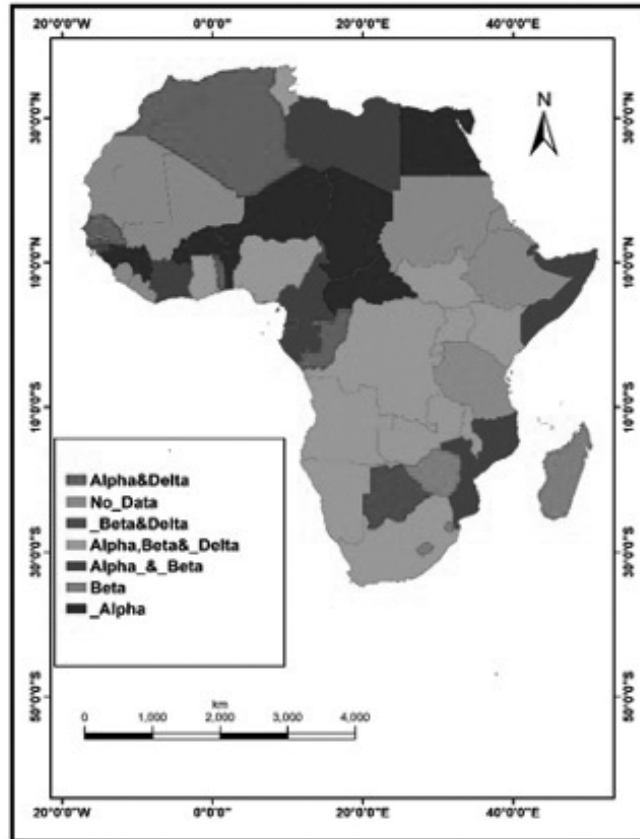
Figure (18). Number of hospital beds per 10.000 people in African States, 2010-2015



Source: Author's data is based on UNDP, (2019:325-327)

Moreover, Africa's increasingly poor healthcare systems, inadequate medical supplies and medical staff shortages are placing the continent at high risk. Most African countries lack sufficient health care services and access even in normal circumstances (in Africa the number of hospital beds per 10.000 people is 12 and in OECD countries is 38) (Fig.18).

Figure (19). SARS-CoV-2 variants of concern reported in African States, as of 21 July 2021.



Source: Author's data is based on CDC, Africa. (2021). Outbreak Brief No. 80. Addis Ababa: African Union.

Three types of SARS-CoV-2 variants of concern have been recorded in Africa. These types are Alpha. B.1.1.7 (United Kingdom), Beta. B.1.351 (South Africa) and Delta. B.1.617.2 (India). The impact of spatial influences and international tourism sources on the distribution and spread of mutated strains in Africa is shown in (Fig.19).

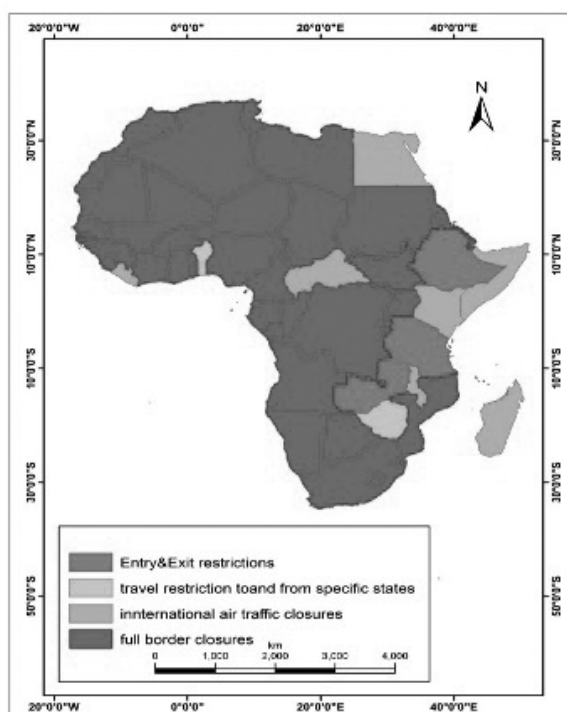
According to the United Nations (30 March 2020), 765,000 people were internally displaced as of February 2020; 2.2 million needed humanitarian assistance in Burkina Faso. The spread of the pandemic in this area would

make it impossible for security forces, health care providers and foreign relief agencies to rescue local populations (African Union, 2020:21).

2. COVID-19 Refraction factors

African countries have taken a range of measures to fight the COVID 19 pandemic, which involve social (physical) distancing and travel restriction. Social (physical) distancing steps include the closing of educational institutions in 53 member states, the prohibition of mass gatherings, and closing of public areas in 53 member states, as well as restricting prison and hospital visits in 11 member states. While night-time curfew had been enforced in 23 member states, 14 member states had partial lock down and 18 had full lockdown.

Figure (20). African states imposing travel restrictions, 2020.



Source: Author's data is based on African Union & Africa CDC, 2020, social distance and travel restriction measures, by member states. Available at www.au.int. April 2020.

Travel restrictions were imposed by African countries; 43 member states imposed full border closures, 7 member states (Egypt, Central

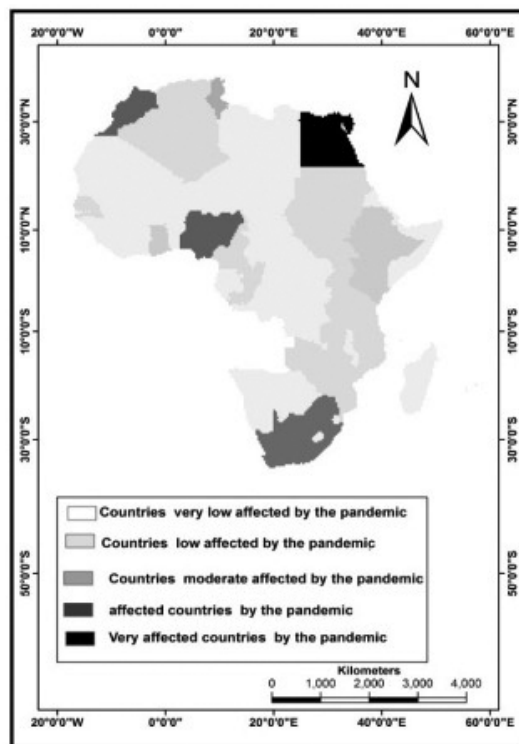
Africa, Kenya, Somalia, Liberia, Malawi, Madagascar) had international air traffic closures; 3 member states (Ethiopia, Tanzania, and Zambia) had restrictions on entry and exit procedures; and 2 member states (Benin and Zimbabwe) had restrictions on travel to and from specific countries, as shown in (Fig. 20) (African union & Africa CDC, 2020).

3. Overlay analysis

African countries were categorized according to the impact of the Corona pandemic and classified into patterns (fig.21).

- Very affected countries (e.g., Egypt)
- Affected countries (e.g., Morocco, Nigeria, and South Africa)
- Moderate affected countries (e.g., Ethiopia, Tanzania, and Algeria)
- Low affected countries (e.g., Namibia, Libya, and Dem.Congo)
- Very low affected countries (e.g., Angola)

Figure (21). Overlay map of African countries affected by the COVID-19 pandemic using multiple criteria Analysis



According to the overlay analysis, Egypt had the highest number of infections in the first wave, and it was the first African country to close its air transport to and from the affected countries since it was the most affected by COVID-19 pandemic being the largest African country in terms of the number of visitors and tourism revenues. Egypt is the leading African country in terms of direct foreign investment as well as the flow of personal remittances from Egyptians living abroad, and it enjoys better health services than other African countries. Morocco, Nigeria Tunisia, and South Africa were also among the countries most affected by COVID-19 pandemic in Africa.

VI. COVID 19 and Tourism in South Africa: Case Study

On 5 January 2021, the number of people infected with Covid-19 in South Africa reached 1.1 million cases comprising more than 30,000 deaths and 920,000 recovery cases, while tests reached 6.8 million. High infection rates were concentrated in KwaZulu-Natal, Limpopo, Northwest, and Western Cape provinces, whereas infection was lower elsewhere (Fig.22). According to the variables of number of international tourists (10 million tourists) and number of national tourists (7 million tourists), tourism power is concentrated in the provinces of Gauteng, Limpopo and Western Cape, which also have high rates of Corona virus infections (Fig. 23).

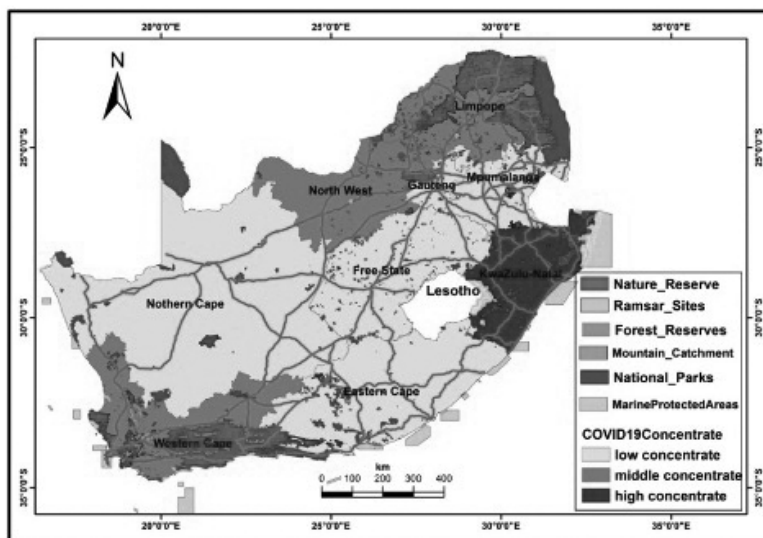
The provinces of Gauteng, KwaZulu-Natal, Limpopo, and the Western Cape were the most affected by the Corona virus pandemic in South Africa because they attract large numbers of international and domestic tourists and have numerous and diverse tourist attractions; Gauteng, for example, offers plenty of entertainment through its network of upmarket shopping malls, casinos, street markets, theatres, restaurants, and tourism attractions, such as the Vaal Dam, the Adler Museum, the Walter Sisulu National Botanical Garden, Freedom Park, Sterkfontein a World Heritage Site, the Absa Money Museum, the Apartheid Museum, and Gold Reef City.

South Africa's Garden province, KwaZulu-Natal, is a garden province that is lush and well-watered subtropical region of valleys washed by the warm Indian Ocean. Dramatic comparisons make up the Limpopo landscape characterized by hot savanna plains and mountains clad in mist, age-old native forests and cycads alongside modern forests Plantations, ancient fortresses of the mountains and Kruger National Park. At the southern tip of Africa lies the Western Cape, the unmatched natural beauty of the province, Cape Agulhas, Garden Route, Cape wine lands and Table Mountain, make it one of the world's best destinations for visitors (South Africa Yearbook, 2019:15-28).

Due to the Corona virus pandemic, tourism in South Africa was affected, as tourism movement decreased from 2.6 million during January-June 2019 to 143,000 tourists during January-June 2020 (Fig. 24). Hotel occupancy rates had declined from 45% in June 2019 to 3.5% in June 2020, the number of directly and indirectly working tourism employees decreased from 16.3 million in June 2019 to 14.1 million in the same month 2020, and accommodations revenues dropped from 5.5 billion rands in April-June 2019 to 172 million rands, a decrease of -97%.

South Africa had declared a 21-day lockdown from 27 March 2020, which was later extended by two more weeks. The government implemented a risk adjustment policy on 1 May 2020 aimed to improve economic growth, while at the same time putting in place steps to minimize the spread of the virus. Five levels of Coronavirus warnings have been implemented as part of this strategy, outlining the various industries that can operate under each of these levels. The country was under lockdown Level 5 in April 2020, which stopped most industries from operating. South Africa shifted to Level 4 lockdown restrictions on 1st May 2020 and moved to Level 3 lockdown restrictions on 1st June 2020 (Department of Tourism, 2020:5).

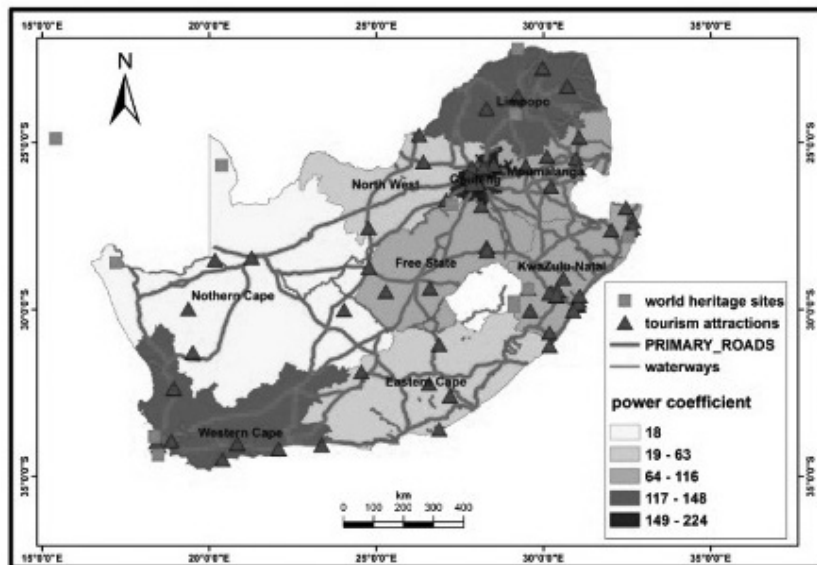
Figurer (22). Spatial concentration index for COVID-19 on 5th January 2021 and tourism attractions in South Africa.



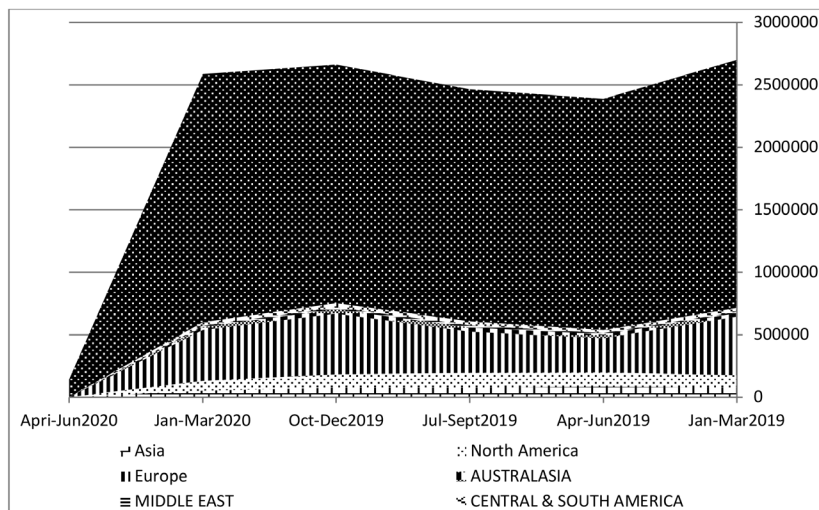
Source: Author's calculation is based on Health Department, update on COVID-19, 5th January 2021.

Website protected planet.net/country/zaf2020jan.2021.

Figure (23). Tourism power coefficient in South Africa by province (2019).



Source: Author's calculation is based on Tourism Department, State of Tourism Report, Johannesburg, 2018/2019:38. Website: whc.unesco.org/en/list/914. Jan.2021.

Figure (24). Number of International Tourist Arrivals by Region to South Africa
January 2019 – June 2020

Source: Author's data is based on Tourism Department, Tourism Quarterly Performance Report, January 2019-June 2020.

VII. Measures taken by African countries to support tourism in the face of the COVID-19 pandemic:

A. Fiscal and monetary measures

Egypt has postponed payment of all duties on tourism and hotel establishments and has deemed all bazars and cafeterias located in archeological sites to be exempted from paying rent until tourism resumes safely. The Egyptian Central Bank offered low-interest tourism facilities, in particular for paying employees' salaries, and it launched a tourism support financing initiative; interest rates were reduced (part of this initiative was directed towards payment of salaries and operating expenses). As part of the initiative, banks could offer credit facilities with a maximum repayment period of two years, in addition to the six-month grace starting from the date of the loan.

South Africa has made available an additional fund to support small and medium-sized enterprises in the tourism and hospitality sector which were under stress due to travel restrictions.

B. Measures to protect jobs and promote training and skills

Further flexibility in terms of social security payments was seen in Morocco, where the share to employers' insurance obligations had been cancelled in its entirety and where the state took up 70% of the lost wages for three months to help part-time employees (UNTWO, June2020 :9-16).

C. Measures to restart tourism

Nairobi and Kigali were scheduled to start international flights on 1st August (YEAR) as the country began reopening its skies in time for the peak season of end-year tourism, and similar decisions were taken in June 2020 in Tanzania and South Sudan. Although international passengers arriving in Kenya and Rwanda needed to obtain a negative PCR, the new entry rules for the two countries varied significantly on the particulars; Kenya, for example, accepted PCR results obtained seven days before arrival, while Rwanda's restrictions only accepted PCR results obtained 72 hours before arrival. Ugandan borders remained closed because there was so much chaos abroad in some countries. While Ethiopian airline continued flying to destinations that still allowed inbound flights. Ethiopian Airlines had operated to 40 destinations by early July (YEAR) (Africa Report, 31 July 2020).

In 2010, China became the world's leading industrialization nation,

ending the over 110-year US leadership era, and according to one prominent economist this significant event marks the completion of a 500-year economic history cycle. If the total economic strength of China outperforms that of the United States, this would, for the first time since 1890, decide whether there is another economy in the world that compares with and surpasses the American economy (Al Gore, 2015:138-160). Will the COVID 19 pandemic create a shift in the world's balance of power?

VIII. Corona virus scenarios 2021-2023

The three scenarios presented below are consistent with UNWTO projections for 2021-2023.

1. Scenario One involves a reduction in tourist arrivals as observed in 2020. Reductions averaged 74% with considerable variation between countries. This average reduction is close to the 75% reduction in UNWTO's pessimistic scenario.

2. Scenario Two involves a reduction in arrivals averaging 63%, which the UNWTO sees as an optimistic outcome in 2021.

3. Scenario Three considers varying rates of vaccination and assumes a 75% reduction in countries with low vaccination rates, and a 37% reduction in countries with relatively high vaccination rates (UNCTAD,2021:13). (Table 3).

Table 3.

Impacts of COVID 19 on Percentage of GDP in African Regions by UNWTO's Scenarios

region	Reduction in inbound tourist expenditure	Sim 1 Observed	Sim 2 Partial recovery	Sim 3 Uneven vaccination
North Africa	-78	-7.5	-5.00	-6.40
Western Africa	-69	-4.6	-3.10	-3.90
Eastern Africa	-69	-9.3	-6.00	-7.90
South Africa	-69	-8.1	-5.50	-6.90
Rest of South African Customs Union	-69	-6.3	-4.40	-5.30
Rest of the World	-73	-3.9	-2.70	-3.20

Source: Author's data is based on UNCTAD, 2021:21.

IX. Conclusion

Examination of the temporary trends of the COVID 19 pandemic in Africa and the African regions has shown that infection rates are less than recovery rates and this means that they are on the way to recovery. Central Africa was the first region in Africa to recover from infectious levels. On 28 July, 2020, infection rates peaked, and then infection rates started to decrease until they reached their lowest levels in the first wave of the pandemic on 12 September 2020; Later, infection rates rose again until they reached their peak in the second wave on 10 January 2021.

From February 15, 2020 until July 27, 2021, Africa was subjected to four waves of the Corona pandemic; the first wave, which was medium, occurred in the months of June and July 2020. The second wave, which was the largest in terms of new cases, occurred in December 2020 and January 2021. The third wave which occurred in March and April 2021 was the smallest ever. The African Continent witnessed the fourth largest wave ever in June and July 2021.

Using the spatial concentration index, the study found that COVID-19 is spatially concentrated in the countries of Namibia and Lesotho in the South African region and the countries of Egypt and Libya in the North African region.

The study indicated that the key reasons for Corona virus spread in Africa were poor infrastructure and health services, together with the prevalence of AIDS, Ebola, Malaria and malnutrition in many African countries, which drove African countries to adopt a series of precautionary measures to fight the pandemic.

The study concluded that air transport, foreign direct investment, personal transfers were the major economic sectors that were most negatively affected by the COVID-19 pandemic. Egypt, South Africa, Morocco, Algeria, Niger, Nigeria, Rwanda, Ethiopia, and Angola are among the countries most impacted by the COVID-19 pandemic.

The study concluded that COVID-19 pandemic will have a negative impact on the number of visitors, revenue, and tourism jobs, especially in African countries, which attract the largest number of tourists and revenues, such as Egypt, South Africa, Morocco, Tunisia, Ethiopia, and Nigeria. The impact ranges from 36% in the best-case scenario to 50% in the moderate case scenario, with the worst case scenario having an impact rate of more

than 71%; this is sufficient enough for the spatial tourism development plans to come to a halt. In addition, the three scenarios are consistent with UNWTO projections for 2021-2023; Scenario One involves a reduction in tourist arrivals as observed in 2020; Scenario Two involves a reduction in arrivals averaging 63%, partial recovery; Scenario Three involves uneven vaccination.

Overlay analysis revealed that the countries most affected by COVID-19 were Egypt, Morocco, Nigeria, South Africa, while the least affected country was Angola (first wave). The provinces of Gauteng, Kwa Zulu Natal, Limpopo and the Western Cape were the tourism provinces most affected by COVID-19 in South Africa.

X. Recommendations

1. Diversifying and transforming African economies by improving the African private sector and the capabilities of manufacturing to convert raw materials locally. This can be done by maximizing domestic resource utilization and reducing the Continent's dependence on foreign financial flows that comprise 11.6% of Africa's GDP compared to 6.6% of emerging economies GDP.

2. Completing the African Medicine sign-off and ratification of (AMA) and making regional private and public partnerships to produce medical and pharmaceutical products while reducing imports into Africa and implementing production quality control.

3. Lifting African countries' readiness, preparation, and responsiveness to cope with all potential scenarios and the need to provide oxygen in large amounts and respirators as an integral component of care. Setting strategic plans for COVID-19 in peak seasons and equinox times in low seasons after every peak.

4. Implementing rapid testing and tracing strategy to help contain the spread of COVID-19. Helping poor African countries receive the Corona virus vaccines, whether they were Chinese, Russian, Indian, American, British or German vaccines, as only 12 African countries had signed agreements to obtain the vaccine by 25 January 2021, namely Egypt, Tunisia, Algeria, Morocco, Senegal, Guinea, Cote d'Ivoire, Nigeria, South Africa, Botswana, Democratic Republic of the Congo, Kenya and Seychelles.

5. Continuing government support for the tourism sector in terms of fiscal and liquidity incentives as well as measures to protect workers.
6. Adopting global protocols on health and safety to ensure that travel is safe again.
7. Encouraging domestic travel and tourism with neighboring countries as a safety valve against external threats and crises.
8. Improving and developing communication and IT to support remote learning, remote work, and E-commerce in an emergency.
9. Fostering African initiatives to eradicate African epidemic and endemic diseases such as Malaria, AIDS, Ebola and malnutrition.
10. Increasing spending on experimental and applied microbiological research because viruses have an immense capacity for rapid spread and unlimited reproduction and can cause epidemics that affect the entire world without distinguishing between developed and developing nations.
11. Establishing global networks and databases to record, monitor and analyze viruses, how to deal with them and predict, alert and react early in the occurrence of a pandemic.

References

- Africa, Center for Diseases Control and Prevention (CDC), (2020). *Social distance and travel Restriction measures by member state*. Addis Ababa: African Union.
- African Union (2020). *Impact of Corona Virus (COVID 19) on Economy of Africa*. Addis Ababa: African Union.
- Al Gore, (2015). The future: Six drivers of global change, Part 1, translated by Dr. Adnan Georges, *Knowledge World Series*, Issue No. 423, April. In Arabic.
- African Union/ Organisation for Economic Co-operation and Development (AU/OECD), (2019). *Africas Development Dynamics: Achieving Productive Transformation*. Paris: OECD.
- Africa Development Bank (2020). *African Economic Outlook, supplement, Amid COVID19*. Abidjan: African Development Bank.
- Center for Diseases Control and Prevention (CDC), Africa (2020). *Map of COVID19 Transmission in africa*. Addis Ababa: African Union.
- Center for Diseases Control and Prevention (CDC), Africa (2020-2021). *Outbreak Brief No.4 to No.80*. Addis Ababa: Africa union.

- Department, Health (2021). *Up date on COVID 19*. Johannesburg: Health department.
- Department, Tourism (2018-2019). *State of Tourism Report*. Johannesburg.
- Department, Tourism. (2019-2020). *Tourism Quarterly Performance Report*. Johannesburg.
- El Banna F. & Ghabour, E. (2015). AIDS between the spatial and temporal change in Africa. In A. Al Badawi, *Africa: continent of promising future* (pp. 629-652). cairo: department of Geography, Cairo University.
- International Air Transport Association (IATA), (2020). *The demand for Air Travelers is at its Worst level in its History*. Geneva: IATA.
- International Civil Air Organization (ICAO), (April, 2021). *Air transport monthly monitor, World Results and Analyses*, Montréal.
- Kuniya, T. (2020). Prediction of the Epidemic Peak of Coronavirus Disease in Japan. *Journal of Clinical Medicine*:1-7.
- Lin, Q. e. (2020). A conceptual Model for the Coronavirus Disease COVID19 Outbreak in Wuhan, China with individual reaction and governmental action. *International Journal of Infectious Diseases*:211-216.
- Morsy, S. & Al Sady, Z. (2020). The Consequences of the emerging Coronavirus Crisis on Egyptian Tourism Iidustry. *Policy Paper Series*: 1-18.
- Organisation for Economic Co-operation and Development (OECD), (2020 A). *The Impact of the Coronavirus COVID19 Crisis on Development Finance*. Paris: OECD.
- Organisation for Economic Co-operation and Development (OECD), (2020 B). *Africas Response to COVID 19*. Paris: OECD.
- Organisation for Economic Co-operation and Development & African Union(OECD & AU), (2019). *Revenue Statistics in Africa*. Paris.
- Organization, I. C. (2020). *Effects of Novel Coronavirus COVID19 on Cvil Aviation: Economic Impact Analysis*. Montreal: Air Transport Bureau.
- Soliman, A. (2013). New Corona Virus Middle East Respiratory Syndrome: A Study in Medical Geography, Kuwait Geographic Society, geographic articles, issue NO.398:1-54. (In Arabic)
- South Africa Yearbook, (2019). government of south Africa, statistics, Johannesburg.
- The Africa Report (2020). Retrieved from The Africa Report: 2- https://www.theafricareport.com/36021/rwanda-and-kenya-reopen-its-skies-in-time-for-peak-tourism/?utm_source=newsletter_tar_daily&utm_campaign=newsletter_tar_daily_31_07_2020&utm_july,2020.

- United Nations Conference on Trade and Development (UNCTAD), (2017). Economic Development in Africa Report. Geneva.
- United Nations Conference on Trade and Development(UNCTAD), (2020 A). How COVID19 is Changing the World: A Statistical Perspective. Geneva: Committee for the Coordination of Activities.
- United Nations Conference on Trade and Development (UNCTAD), (2020 B). World Investment Report. Geneva.
- United Nations Conference on Trade and Development (UNCTAD), (2020). COVID19 and Tourism: assessing the economic consequences. Geneva.
- United Nations Conference on Trade and Development (UNCTAD), (2021). COVID 19 and Tourism and update: Assessing the economic consequences, Geneva.
- United Nations Conference on Trade and Development /Organisation for Economic Co-operation and Development (UNCTAD/OECD), (2020). Twenty-third Report on G20 Investment Measures. Geneva.
- United Nations Development Program(UNDP), (2019). Human Development Report. New york.
- United Nations Educational, Scientific and Cultural Organization (UNESCO), (2020). UNESCO. Retrieved from World Heritage Center: <https://www.whc.unesco.org/en/list/914>,jan.2021.
- United Nations of World Tourism Organization (UNWTO), (2020 A). Impact Assessment of the COVID19 on International Tourism. Madrid.
- United Nations of World Tourism Organization (UNWTO), (2020B). Tourism and COVID19. Madrid. Retrieved from [https://www.unwto.org/unwto-tourism-dash board](https://www.unwto.org/unwto-tourism-dash-board) oct.2020
- United Nations of World Tourism Organization (UNWTO), (2020). How are Countries Supporting Tourism Recovery? Madrid.
- United Nations of World Tourism Organization (UNWTO), (2020). Appel urgent a la communaute Internationale pour soutenir le secteur des voyages et du tourisme en Afrique. Madrid.
- Waqas, M. A. (2020). *Analysis and Prediction of COVID-19 Pandemic in Pakistan using Time-dependent SIR Model*: 1-12.
- World Health Organization (WHO), (2020). Situation Report No.183,Corona Virus diseases. Geneve. Retrieved from https://www.who.int/docs/default-source/wha-70-and-phe/20200721-covid-19-sitrep-183.pdf?sfvrsn=b3869b3_2 july,2020.

- World Travel and Council (WTTC), (2020). WTTC Now Estimates over 100 million jobs losses in the travel & tourism sector and alerts G20 Countries to the Scale of the Crisis. London.
- World Travel and Council (WTTC), (2020). *Recovery scenarios of economic impact of COVID19*. London: Research Unit.
- World bank (2013). *Tourism in Africa: Harnessing Tourism for growth and improved Livelihoods*. Washington.
- World bank (2020A). *World development indicators*. Washington. Retrieved from <http://datatopics.worldbank.org/world-development-indicators/themes/global-links.html#migration-and-personal-remittances>, july,2020.
- World bank (2020B). *World development indicators*. Washington. Retrieved from <https://data.worldbank.org/indicator/ST.INT.ARVL> , july,2020.
- Zhong, L.Mu, L., LI, J. Wang, J. Yin, Z. and Lui, D. (2020). Early prediction of the 2019 novel coronavirus outbreak in the mainland China based simple mathematical model. IEEE Access: 761-769.

Submitted: September 2020

Accepted: November 2021

