



Research Article

Impact of the Strategies Deployed by Morocco to Reduce Health and Socio-Economic Risks during the First Half of the COVID-19 Pandemic

Oumaima Ninich¹, Aziz Et-tahir^{1*}, Thierry Rock Jossou¹, Kettani Kamal¹, Daton Medenou²

¹Materials, Energy and Acoustics Team, High School of Technology-Sale, Mohammed V University, Rabat, Morocco

²Department of Biomedical Engineering, Ecole Polytechnique Benin, University of Abomey-Calavi, Cotonou, Benin
E-mail: ettahiraziz@hotmail.com

Received: 3 November 2020; **Revised:** 16 January 2021; **Accepted:** 4 February 2021

Abstract: Over the last three decades, the world has been confronted with several respiratory syndromes epidemics as: SARS in 2002, the H1N1 pandemic in 2009, the Middle East Respiratory Syndrome (MERS) in 2012 and the Ebola epidemic in 2014. They have resulted in significant direct and indirect mortality and morbidity. In this work, we analyze the strategies implemented by Morocco by highlighting the strengths and weaknesses of all the actions undertaken that have made Morocco an example in the COVID-19 pandemic management. In order to obtain convincing results, Morocco adopted the precautionary principle by taking drastic measures as soon as the first case of contamination appeared. These measures were taken considering the population, thus saving time and gradually acquiring the adequate logistical resources for the epidemic management. Among these measures which have proved their effectiveness, we find the emergence of a local sanitary equipment and devices industry necessary for the protection and care of COVID-19 (artificial respirator, masks, hydro-alcoholic gel...), the construction of the largest hospital in Africa in 15 days (700 beds) for the care of people with COVID-19, the chloroquine and hydroxychloroquine based dual therapy adoption, compensation for individuals and companies, the cultural aspect and societal practices in addition to strict progressive containment. Thus, the study of the strategies implemented by the government of the Kingdom of Morocco since the state of emergency declared on 20 March, the date of the containment beginning to its end, has highlighted the main influences on the capacity of all the players to successfully manage the socio-economic and health situation, making Morocco an example in the management of the COVID-19 pandemic, as have Germany, South Korea and the Scandinavian countries, with a lethality under 200 deaths.

Keywords: COVID-19, containment, Morocco, social, economic, health, disaster, management

JEL Codes: I15, I18

1. Introduction

In the first few months of 2020, societies around the world were hit by the new epidemic of coronavirus (COVID-19) (Vaudano et al., 2020), which led the World Health Organization to declared COVID-19 pandemic on March 11 (WHO, 2019). The Kingdom of Morocco declared a state of national emergency on March 2, the date of the first infection case,

and implemented measures to contain the spread of the epidemic on March 9. These measures began with the partial suspension of flights and maritime traffic. These preventive measures were generally welcomed, although certain deviations as well as certain deficiencies happened (Rhanja, 2020; Vigeo-eiris, 2020).

It should be noted that Morocco is one of the best integrated countries in the region in world economy with partners such as France, Italy and Spain, which are the most affected countries by the pandemic. Indeed, the first cases imported to Morocco came from these countries, then the virus was transmitted to local citizens.

If all the indications show that Morocco has pertinently managed this pandemic (Benamour, 2020; Bernard, 2020), this efficiency has been self-imposed as an imperative for various reasons, especially the limited logistics in Morocco in terms of health management. In fact, in terms of intensive care beds, Morocco has about 1600, so the demand is higher than the supply. In addition, a small number of doctors per resident, that is 7.3 doctors per 10,000 residents whereas, France and Cuba have 34 and 75 doctors respectively. Thus, Morocco had no choice but adopting the precautionary principle without waiting for the pandemic evolution (phases 2 and 3).

Drastic measures were gradually taken (Cord, 2020) in a well thought out logic, allowing Morocco to rediscover, in a logic of paradigm shift, the sovereigntist and protectionist, and consequently, the return to the social state is essential. Though, a few months ago, everyone praised the merit of free trade and globalization, putting realism before ideological discourse and adopting the neoliberalism imposed by the International Monetary Fund (IMF). Therefore, we can consider this efficiency as the fruit of realism coupled with an imperative of reality leading to effectiveness.

While, alongside other health measures, containment and social distancing (Rehman et al., 2020; Calsyn et al., 2020), have become one of the priority response tools in many countries, they have led to an unprecedented economic crisis on the global scale. Thus, the economic crisis expected for 2021 will be unprecedented in its scale and extent. It will bring into strong recessions most of the major worldwide economies, but also many developing countries such as Morocco. It should be noted that any economic crisis generates automatically a social crisis, with a major risk of security, social, societal and political instability as well as an outright risk of failure of public finance systems.

In front of this unprecedented crisis, unprecedented recovery plans have been implemented by the main world economies to save the economy and the most affected sectors, and also to mitigate the social effects of the pandemic. Actions by governments have certainly been necessary for the short term but are limited in the medium and long term. They may even prove counterproductive, as they would quickly exhaust state resources and lead to the bankruptcy of public finances.

Several studies have shown that containment (Rehman et al., 2020; Ennaji, 2020; Oliveira & Rossi, 2020), can be a back-up but temporary mechanism to curb the spread of the virus and flatten the epidemic curve. Therefore, while waiting for a vaccine, the most realistic solution for many experts is the “progressive containment”. This is based on a strict containment able to slow the spread of the virus and then on a gradual return to normal life concerning the economic activities while applying sanitary measures.

In this perspective and to help reducing and identifying the social and economic risks of COVID-19, the kingdom of Morocco has adopted the strategy of strict and general containment decreed from March 20, followed by a gradual lifting of containment scheduled to June 10 (Finances News, 2020). To achieve this, the country has taken into account the most significant parameters such as:

The epidemiological criteria showing a significant reduction and stabilization in the number of hospitalizations and/or new cases over an extended period;

The sufficient capacities of health care systems, in terms of hospital beds in intensive care, quarantine spaces and pharmaceutical products and equipment stocks;

Adequate monitoring capacities by the generalization and automation of screenings, monitoring of patients and quarantined people and the more general identification of suspect cases by implementing an intelligent mobile application.

In the rest of this article, we will present the strategies implemented by the government of the kingdom of Morocco that made it a model for managing the COVID-19 pandemic, placing it in the ranks of Germany and South of Korea. We specifically focus on the following questions (Cord, 2020; Maneesh & El Alaoui, 2020):

Would the COVID-19 pandemic have made the kingdom of Morocco a model in the management of pandemic, if so, how?

Would this management of the health crisis be the first step in establishing a strategy to fight against future crises?

Explanatory details of the reason for the success of these strategic actions will also be presented below.

2. Methods

This study was based on the analysis of the actions taken by the government in the management of COVID-19 health crisis from March to the end of June 2020, to measure their impacts on the control of health and socio-economic risks. Most of the major actions implemented by the government have been identified and described. The various data, graphs and information used in this study were obtained from official information channels, and international pandemic monitoring agencies as: Deloitte Cabinet, OpinionWay Polling Institute and 35-North Consulting Agency.

3. Community quarantine in Morocco: actions description

During this health quarantine in Morocco, imperatives appeared with recommendations that reflect an approach of responsibility and solidarity towards our fellow citizens concerning the potential impact of this epidemic (OECD, 2020), both socioeconomic and local critical care resources. The success of this quarantine is conditioned by the reactivity of all the components of Moroccan society perceived through a number of actions (Bernard, 2020; Lesueur, 2020):

- Awareness and information;
- Availability and local production of masks;
- Availability and local manufacture of hydro-alcoholic gel;
- Local manufacture of artificial respirator;
- Adoption of dual therapy based on Chloroquine and Hydroxychloroquine;
- Respect for containment;
- Compensation for individuals and companies.

3.1 Availability and local production of masks

How did Morocco manage to have so many masks?

Contact had been made with a number of companies in the industrial and textile fields with the aim of creating a synergy with a view to pooling skills and producing masks that meet ISO (Bounani, 2020) and medical standards. These are not surgical masks but protective masks that everyone must wear to protect each other, but do not protect from external contagion (Bouchnita & Jebrane, 2020).

So very quickly, Morocco reoriented and reconverted the textile industry to medical textile ones, with doctors' assistance in the fabrication process. From the beginning, the state has taken measures to allow almost free masks or access to masks at a nominal price (7 cents of Euro per 10 masks) by setting up a special fund (la tribune, 2020a) to manage this pandemic. This fund received donations from private companies, businessmen, public enterprises and institutions but also from citizens, which enabled it to quickly collect 4.5 billion dirhams. So, it is with this background that the state subsidizes masks whose production cost is much higher and very quickly we reach a production of 8 million masks per day.

3.2 Awareness and information

The mechanisms to raise awareness of the dangers of Coronavirus and good practices to avoid any contamination have multiplied via digital, visual, spot, etc. channels, among other things, by answering certain questions such as:

- What is the "new" coronavirus?
- How does COVID-19 spread?
- What are the symptoms of coronavirus?
- How to avoid the risk of infection?
- Do I have to wear a medical mask?
- How do I wash my hands properly? When?

3.3 Availability and local manufacture of hydro-alcoholic gel

The place of manufacture, distribution and selling price was regulated by the law 17-04 on the drug and pharmacy code (article 2) for the generalization of hydro-alcoholic gel production (WHO, 2009; Medias24, 2020b).

In addition, with regard to availability in the Moroccan market, the government plans to boost local production and speed up administrative import procedures. The objective is to guarantee the supply of the necessary quantities of hydro-alcoholic gels in order to meet the needs of citizens. The selling prices to the public are fixed by decree n° 986-20 of the Ministry of Economy and Finance and must appear on the labeling accompanied by the product registration certificate number or the number temporary marketing authorization (Medias24, 2020a).

3.4 Local manufacture of artificial respirators

For artificial respirators, they can be categorized between complex respirators whose breathing is done in an invasive way by intubation and mobile respiratory devices. They can be used in ambulances and can only help patients who have respiratory distress but with a regular rhythm which, basically, doesn't need a complex device. Releasing them to be used and deployed for more serious or relatively moderate situations. To this end, a number of companies have joined forces to pool their skills, develop, and manufacture mobile artificial respirators (la tribune, 2020b). These same companies are developing a more complex device that is currently in the prototyping phase, but the temporality of the research is not the same as the crisis ones. This did not prevent Morocco from purchasing respirators abroad to increase these capacities of intensive care beds by equipping them with respiratory devices. Meanwhile, we are rediscovering an aspect of Moroccan culture that has been hidden for decades. Indeed, Morocco is able to mobilize talented people, engineers, designers, builders to produce a product with local assembly and design while being subjective in this description (100% Moroccan) because electronic components can be, in part, imported. So, there is a hardcore of strategic sectors which must remain in order to remain sovereign technologically, economically and regionally, notably in the pharmaceutical industry to produce generic drugs, in the manufacture of sanitary appliances, in army equipment and in infrastructure. All this will become more and more a state imperative and it is the first step towards a rediscovery of economic sovereignty.

3.5 Recommendation for dual therapy based on Chloroquine and Hydroxy Chloroquine

Morocco has not fallen into the trap of ideological struggles and conflicts of interest that some countries have known to decide on the use of the dual therapy recommended by Doctor Didier Raoult in order to establish a protocol for treating people arriving at the level of public health centers. And very early Morocco applied this dual therapy which included Chloroquine and Hydroxychloroquine combined with a pulmonary antibiotic (Pygaglio, 2020; Samer et al., 2020).

For this purpose, on March 22, the Stocks of Chloroquine and Hydroxychloroquine available in Morocco were requisitioned by the state therefore they can no longer be bought in pharmacies.

Morocco has favored observational medicine starting from the reality to treat people effectively without being against research and the results are encouraging and very interesting (Health Word, 2020; Guessous, 2020). The doctor then searches in his arsenal for old and known molecules which can help patients to heal while waiting to find an effective treatment which is a long-term period before obtaining authorization and legislation for its generalization.

Morocco adopted this dual therapy protocol around March 22 and April 9, we noticed a dropout of cumulative deaths with a curve that begins to flatten and there are fewer and fewer deaths with cures which have literally taken off, unlike March, which saw a relationship between cumulative deaths and very close cumulative healings. This rapid takeoff coincided with the application of dual therapy as recommended by Dr. Raoult.

3.6 Respect for containment: Difficulties and outcomes

Containment in Morocco was gradually implemented, we started by closing coffee shops, restaurants and hammams and then mosques and contrary to what Western observers believed (Rehman et al., 2020; Calsyn et al., 2020; Yabiladi, 2020), mosques' closing (Ennaji, 2020) was generally well received and accepted and the logic of this decision

has been well assimilated and had been seen as citizens lives preservation. Then, we went towards an increasingly generalized containment, and police and army have been used to support logistical terms (Yabiladi, 2020). Exit exemptions have been requested from citizens for one person per household on average to go shopping and go to work. The agent of the authority must sign the exemption to be able to circulate. Overall containment is well respected after it must be understood that in working-class neighborhoods, there is an imperative of survival because there are people who live day by day, they cannot afford to stay in containment total and radical, and naturally, they go out to work wearing the mandatory mask. There are therefore degrees of respect for containment depending on the economic classes concerned. The authorities in relation to containment with a view of controlling the pandemic tolerate relative laxity. A strict and radical containment prevents collective immunity (Maloney & Taskin, 2020), on the other hand, containment with a relative degree of freedom allows little by little the pandemic curbing, and accompanying the establishment of collective immunity (this is a hypothesis). There was overall support for the measures taken by the state because the process was not a coercive one. From the beginning, speakers have been used for people information and education on the authorities' presence for their well-being. There was a watchful face displayed by the authorities and on the other side, there is a solidarity and a paternalistic logic and not a coercive logic.

3.7 Compensation for individuals and companies

At the time of this unprecedented crisis and in order to mitigate the social effects of the pandemic, the state proceeded by compensating workers who were temporarily or permanently unemployed due to the Coronavirus according to eligibility criteria well determined. Indeed, the people concerned are those who work in the formal sector and who are declared by the companies which lost half of the turnover and who were forced to lay off people because of the decline in activity following the pandemic. These people can benefit from a compensation of 2000 dirhams per month (190 Euros) which represents $\frac{3}{4}$ of the minimum wage, it is a small compensation, but it allows these people to hold out for three months while setting up a possible stimulus policy.

But for people working in the informal sector and more suffering from the economic crisis, they receive less compensation to 2000 dirhams or that oscillates between 800 and 1200 dirhams depending on the number of family members. These compensations are made through the solidarity fund (la tribune, 2020b) to fight the pandemic. This fund will also be used for other actions. In fact, firstly to medically equip hospitals in terms of respiratory devices among others and secondly to aid businesses with tax charges and monthly payments of credits withholding (for businesses and households).

All these drawdowns on the state treasury will then lead to a loss of tax revenue and a worsening budget deficit (Nicola et al., 2020). In this emergency policy, all that Morocco can do immediately is to guarantee a minimum of cash to avoid a monetary desert at the level of the diminished social strata and to avoid an implosion of solvent demand.

4. Deployed actions' results analysis

Morocco, a country of 35 million people is relatively unaffected by the new coronavirus. Thus, on 10 June, the date of the end of confinement decided by the Government of Morocco, the Ministry of Health announced 71 new cases of COVID-19 bringing the total to 8508 contaminations recorded since the beginning of containment on March 20, 2020. The number of cures increased to 7565 with 72 new cures recorded. A newly recorded death officially bringing the number of deaths to 211 in Morocco (Finances News, 2020). We can see in these figures that the strategies taken by Morocco to fight against the spread of COVID-19, have surely been at the origin of this honorable performance, both in relation to the African and the European country in particular France. This is confirmed by the results that we exploited from a survey of a trio consisting of "Deloitte Cabinet", "the Opinion Way polling Institut", and "35-North Consulting Agency" on the percussion of the COVID-19 pandemic in Africa including Morocco (Deloitte et al., 2020). In the following lines, we will present the analysis of these results in relation to the actions cited above.

The study entitled "African public opinion face COVID-19 crisis" was carried out among 500 Moroccans aged 18 and over, between 2 and 14 May 2020. It first highlighted of all, strong concern about the economic and social consequences, in addition to fears about the spread of coronavirus and health consequences, while demonstrating strong confidence in their government's actions in response to the crisis and support for economies and populations, which we

will detail in the “Discussion” section.

Anxiety about the economic situation is 67% and it is lower than that estimated in France at 88% and Italy at 76%, for example. This is a testament to a remarkable sense of responsibility and resilience in Morocco and even Africa, fueled in particular by the responsiveness of the Moroccan government, which, in addition to early health protection measures, has been able to quickly put in place plans to support economies and social support for populations. In this crisis, Morocco has demonstrated its collective intelligence in the cooperation and mobilization of all actors and resources. The stakes are high, both in terms of public finances and in the human sector, says *Brice Chasles*, French speaking Africa Managing Partner at Deloitte.

Regarding confidence in the Government of Morocco in the actions and strategies taken to limit the effects of the epidemic, it can be noted through this survey, that 97% of Moroccans (Table 1) trust their government dethroning African countries that also have an honorable rate of around 82% against 39% for the French according to the same poll conducted by Deloitte et al. (2020).

Table 1. Confidence rate in government to limit the effects of the coronavirus pandemic in the 8 African countries surveyed

Country	Confident (%)	Rather confident (%)	Rather unconfident (%)	Unconfident (%)
Morocco	66	31	2	1
Ivory Coast	66	23	6	5
South Africa	43	45	11	1
DRC	64	23	8	5
Algeria	59	26	8	7
Egypt	43	32	11	14
Ethiopia	37	32	5	26
Nigeria	37	23	20	20

Source: Deloitte et al., 2020

The Deloitte OpinionWay 35-North study also confirms a high level of adherence to measures to prevent and enforce barrier gestures (wearing a health mask, no longer shaking hands, kissing and close contact, family and public gatherings, use single-use handkerchiefs, cough into an elbow, avoiding public places, washing hands most often or using a hydro-alcoholic solution) with an overall rate of 95%.

The study also shows that the government that inspires more confidence in adherence to travel restrictions (confinement and curfew) to limit the effects of the pandemic, Morocco with a rate of 97% of which 66 are quite confident. By comparison, the French government with only 51% and 36% confidence respectively of the containment and curfew of respondents in a similar survey conducted by Opinion Way (Deloitte et al., 2020).

Regarding perceptions of the country’s future economic situation, Morocco has recorded a rate of 65% where the situation “will deteriorate”, 35% the situation “will not change or will improve” against 88% and 76% “will deteriorate”, 11% and 24% “will not change or will improve” respectively for France and Italy.

The perception of the evolution of the situation of companies and their professional activities in the coming months is 47% where the situation “will deteriorate” and 53% “will not change or will improve” for Morocco against 55% and 53% “will deteriorate”, 42% and 47% “will not change or will improve” respectively for France and Italy.

As for the perception of the evolution of the personal financial situation in the coming months, it is 51% “will improve or not change” and 49% “will deteriorate” for Morocco while for France and Italy, they are respectively 46% and 48% “will improve and will not change” 52% “will deteriorate” for both.

Despite the responsiveness of African governments, disparate, different, and precise concerns about the consequences of the crisis are emerging between Morocco and sub-Saharan countries. As well, 70% of those surveyed fear a food crisis, and 84% fear an increase in poverty, while Morocco shows broad confidence in the supply of food by its government with a just 2% rate fearing a food crisis. This shows the trust Moroccans place in the government to eliminate any risk of food shortages.

Confidence in the various sources of information on the health situation has also been surveyed (Deloitte et al., 2020) and the result is that Moroccans have a lot of trusts (between 90 and 98%) in information from the government, doctors, the media and government-advised experts. This level of trust is deteriorating relatively for NGOs and social networks. We also note that the Moroccan government through its doctors and experts and the neutrality of the media has managed to maintain wide confidence than in France and Germany (Table 2). The latter is one of the countries that has managed the spread of the COVID-19 pandemic well.

Table 2. Confidence rate in sources of information on the current health situation

Sources of information	Confidence rate		
	Morocco	Germany	France
Doctors	98%	86%	89%
The government	91%	66%	39%
Media TV radio press	91%	53%	35%
The scientific experts who advise the government	90%	79%	66%
The world health organization	83%	-	-
Large state-owned enterprises	69%	-	-
Large private companies	62%	-	-
The united nations	59%	-	-
The Organization of African Unity	49%	-	-
Social networks	43%	23%	16%

Source: Deloitte et al., 2020

Through these results, we will expose in the discussion section, the health and socio-economic impact of the strategies developed and executed by the Kingdom of Morocco in the fight against coronavirus.

5. Health and socio-economic impact discussion

While more than half of the world's population is subject to containment measures, the Moroccan authorities, like the rest of the world, have put in place a wide range of measures to ensure targeted intervention and deal with the situation of health emergency and its socioeconomic repercussions. As the strategies put in place and their successive revisions progressed, this national plan gradually integrated the preparation of the economic sector into its objectives, until the point of recognizing companies as a key player in the response to the epidemic. Indeed, the COVID-19 pandemic, beyond the anticipated number of direct victims, however considerable in itself, is also the threat of economic and social disorganization.

In this regard, finding common ground to reconcile health, economic and social plans will undoubtedly require the combination of several measures as well as wisdom and good governance in their implementation (Pygaglio, 2020; Buheji & Dunya, 2020). Henceforth, Morocco has seen the development of guidelines taking into account its infrastructure, its financial means, its culture and its own history. But, it is too early to know whether these measures will prove to be weak to limit many deaths, or whether they will be so extreme that they will trigger an economic disaster. What is very clear is that, presently, the response to the pandemic at the national level does not contrast with the absence of effective action against, the socio-economic threat despite a certain number of similarities between the two threats.

The problem posed by this multifactorial pandemic threat varies from the health problem, to maintain public order and economic balance, until safeguarding the country's fundamentals. A blurry problem leaves many questions open. Among the priority questions identified to which we have tried to answer partially or totally, we can cite:

What control capacities we shall have?

What health and medical resources would be useful, effective and available?

How long these measures would lose their effectiveness?

What are the health, social and economic consequences of implementing health measures?

Who are the people most affected by the negative social consequences of implementing health measures?

What are the new forms of vulnerabilities generated by these measures and which affect them?

How can secondary impacts be quickly identified and mitigated?

How did the actors involved in the response to COVID-19 identify and anticipate the negative consequences of the measures intended to combat the epidemic in order to mitigate them?

What are the relevant, feasible and effective approaches to promote acceptance, adoption and compliance with public health measures for the prevention and control of COVID-19?

What are the factors which have favored the adoption and respect of public health measures in terms of prevention and control, in particular with regard to confinement, social distancing, hygiene, hand washing, wearing a mask, mutual aid, etc. as well as the capacity of vulnerable populations to comply with public health measures?

Through the few variants of strategies taken by the government of Morocco and whose implementation also depends on the characteristics of the populations (High Authority for Health in France, 2020), we will present the answers to these questions which are only proposed avenues that can be adapted according to the evolution of the situation and the epidemic. It is an analysis of the impact of these measures taken on the health, economic, social and societal levels (Deloitte et al., 2020) which will be detailed for future decision-making and above all to overcome the uncertainties that the economic sector would pose in this period of crisis.

5.1 Health impact

After less than two containment, the overall state of the health situation is relatively controlled (Figure 1) (Shannon, 2020). Compared with the containment parameters cited, the impact of the actions mentioned above on Morocco's health situation can be summarized as follows:

Due to social distancing and containment measures (Rehman et al., 2020; Oliveira & Rossi, 2020), the epidemic has lost its intensity since its beginning by the record of a decrease in R_0 from 2.53 to 1.2 as shown in Figure 2. We may consider that we are in the second phase of the epidemic, the consolidation phase and, in the absence of exceptional events, we shall begin the cycle of regression of the epidemic curve in the coming days. The basic reproduction rate R_0 represents a sort of Richter scale of transmissible diseases, it allows us to know the average number of people who may be infected.

A relatively low rate of daily growth of new cases, between 3 and 6% in the last fortnight, with the exception of the third week of April, where a tray of 200 new cases on average per day were affected by the emergence of industrial points (Figure 1);

The use of only 14% of the national capacity available in intensive care. In this sense, the largest hospital in Africa dedicated to the care of people with Coronavirus was built (in 15 days). The good management of hospital capacity and control of the epidemic spread avoided a catastrophic scenario in which Morocco would reach the limit of its hospital capacity dedicated to intensive care, estimated by 3000 intensive care beds.

There would be a rapid increase in the death rate beyond 20%, which can lead to a significant overburdening of the health care system.

With a bold therapeutic management protocol, in this regard, Morocco bought a stock of Chloroquine at the end of March (Bounani, 2020); a significant increase of healed patients that were treated by this dual therapy illustrated in Figure 3.

A significant reduction of the number of infections and therefore the number of deaths with the level of containment increasing. Figure 3 shows that from a containment applied 66% of the population, we notice a flattening of the epidemic curve, we also find that from 85% containment, many individuals escape infection and the curve of infected people becomes flatter.

A continued downward trend of the death rate shown in Figure 4 (3.1 versus 10% a fortnight ago) and the proportion of serious cases (less than 4.5%). But these figures are temporary and incomplete.

The requirement to wear masks by 7th of April and their manufacture was record-breaking prices (8 dollar per 100 masks) to minimize the risk of contagion from undetected cases. Theoretically, full adherence to the mask-wearing

strategy significantly reduces the number of infected people (Figure 5). On the other hand, we estimate that from 90% of non-compliance, we will see congestion of hospital care services.

The local manufacturing of respirators increasing by the synergy of many companies to pool their skills, develop and manufacture mobile artificial respirators. But this didn't prevent Morocco from importing them, thus meeting the urgent needs of hospitals dedicated to fight the epidemic.

A projection of the number of the tests increasing will eventually aim to identify infected and asymptomatic (infected but without symptoms) people. This will depend on available financial resources and expected efficiency. To this end, according to Figure 6, the number of tests increasing does not have a strong impact on the epidemic regression. Indeed, as long as the number of screening tests does not reach 5% of the population, this policy does not seem to bear fruit on the flattening of the epidemic curve. We can explain this phenomenon by the large proportion of healthy people in the population who are likely to be tested. According to Figure 7 and in accordance with our simulation (Bouchnita & Jebrane, 2020), only countries that have conducted mass screening have satisfactory results. This is the particular case for Iceland and Bahrein, which, with a screening rate of more than 5%, have a rate lethality of less than 1% (Moyou, 2020). On the other hand, even with a number of screening tests in the hundreds of thousands, the countries of the old continent have the highest rates of lethality and mortality.

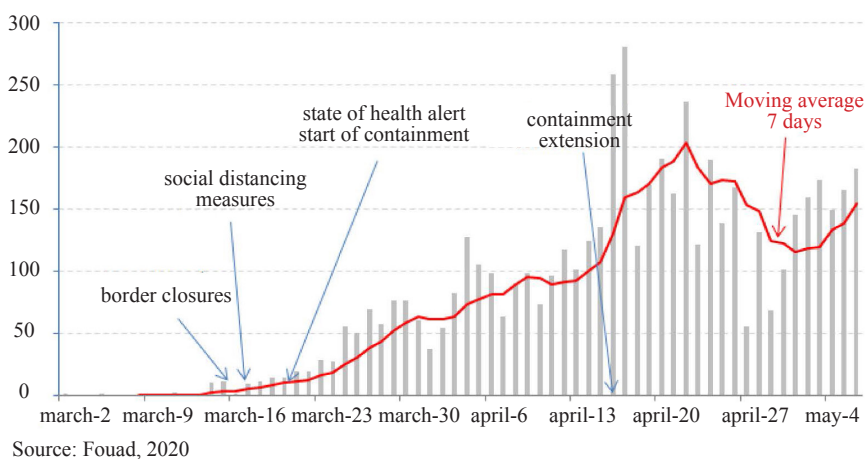


Figure 1. Evolution of cases confirmed in Morocco by day of care

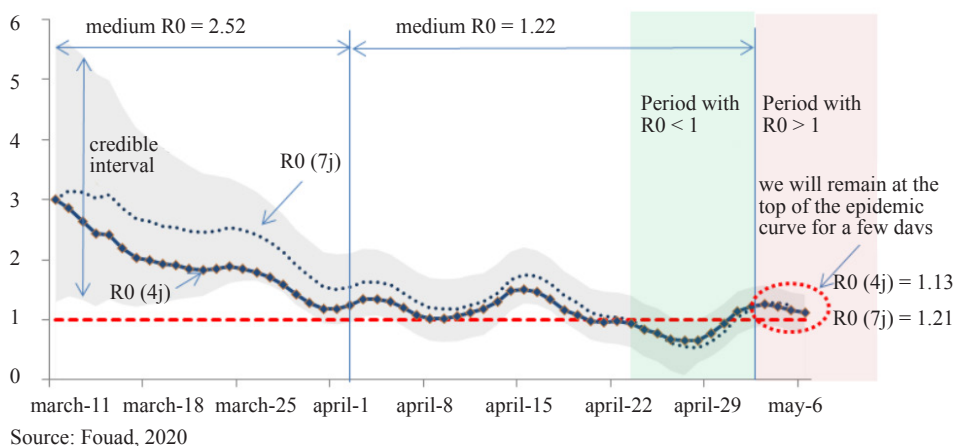
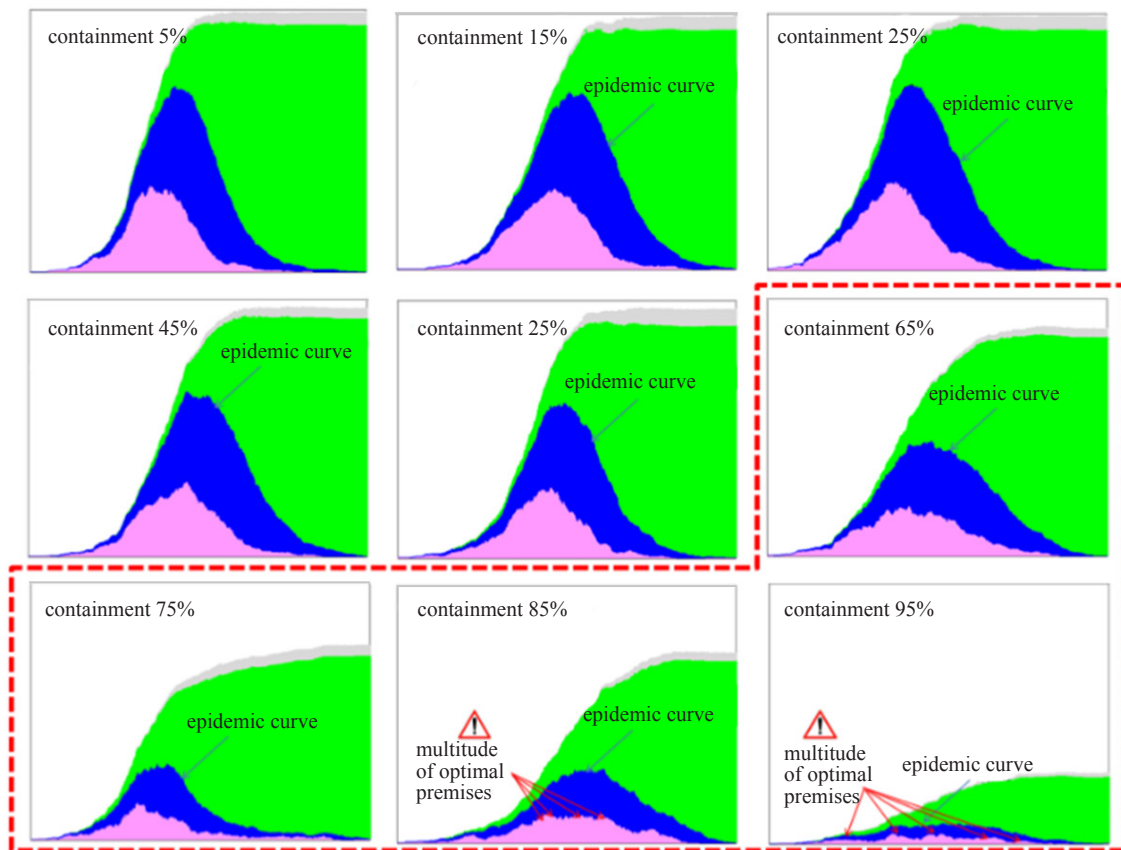
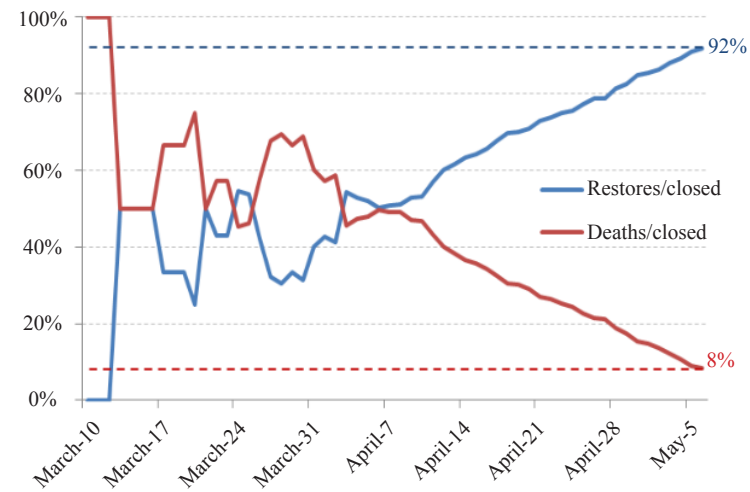


Figure 2. Evolution of R0 over the time scale: case of Morocco, May 6



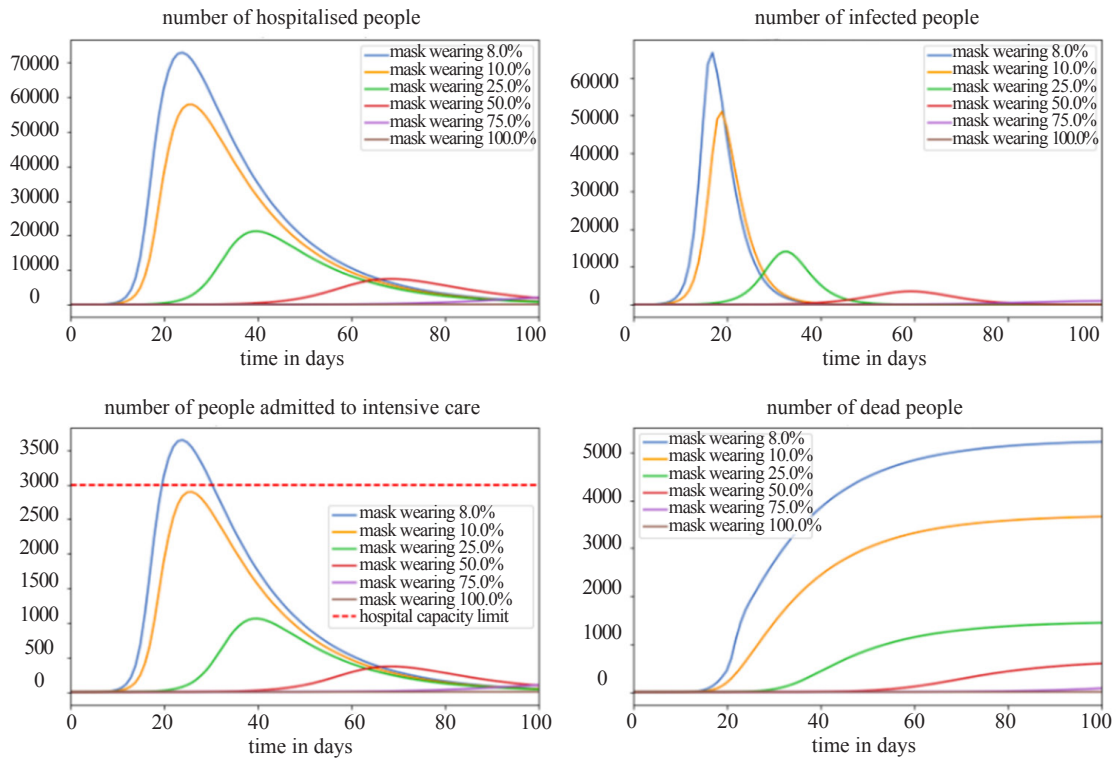
Source: Fouad, 2020

Figure 3. Impact of containment



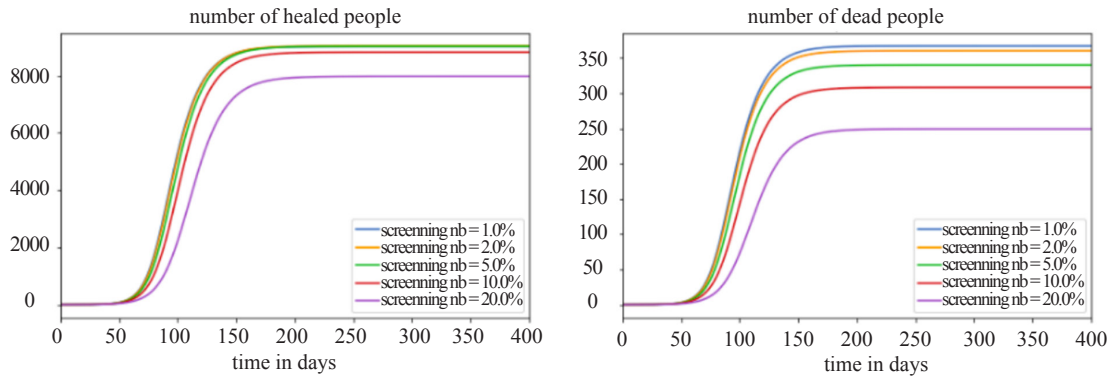
Source: Fouad, 2020

Figure 4. Death rates and closed recoveries related to COVID-19: Morocco, May 6



Source: Fouad, 2020

Figure 5. Evolution of people number according to compliance with the mask wearing strategy



Source: Fouad, 2020

Figure 6. Evolution of the death and people healed number

Table 3. Epidemic situation by country: May 1

Country	Declared cases	Deceased cases	Tests number	Targeting	Tests % of population	Death/l million	Lethality
Iceland	1,797	10	49,961	3.6%	14.64	29.30	0.6%
Bahrain	3,040	8	134,082	2.3%	7.88	4.70	0.3%
Israel	15,946	222	385,992	4.1%	4.46	25.65	1.4%
Purtugal	24,987	1,007	439,616	5.7%	4.31	98.76	4.0%
Italy	205,463	27,967	2,053,425	10.0%	3.40	462.55	13.6%
Belgium	48,519	7,594	345,942	14.0%	2.98	655.23	15.7%
United States	1,069,826	63,006	6,551,810	16.3%	1.98	190.35	5.9%
Netherlands	39,316	4,795	231,265	17.0%	1.35	297.84	12.2%
Turkey	120,204	3,174	1,075,048	11.2%	1.27	37.63	2.6%
South Korea	10,774	248	623,069	1.7%	1.22	4.84	2.3%
United Kingdom	171,253	26,771	726,279	22.5%	1.12	394.36	15.6%
France	129,581	24,376	724,574	17.9%	1.11	373.46	18.8%
Iran	94,640	6,028	475,023	19.9%	0.57	71.77	6.4%
Tunisia	994	40	24,055	4.1%	0.20	3.38	4.0%
Japan	14,281	432	174,150	8.2%	0.14	3.42	3.0%
Morocco	4,423	170	37,006	12.0%	0.10	4.61	3.8%

Source: Fouad, 2020

Mass screening

High mortality rate

5.2 Economic impact

The Moroccan economy is linked to external and internal demand, to which the balance of payments and public finances are highly sensitive. Independent of the economic sector, a containment of several months is difficult to bear by Morocco without heavy economic and social consequences (the absence of tourism, unemployment, the decline in transactions of Moroccans Residents abroad, the economic recession, ...), knowing that according to the latest figures of the Office of the High Commissioner for The Plan of Morocco (HCP-Maroc, 2020), 57% of companies are temporarily out of business and 6300 of them have stopped their activities. For companies, the return to the speed of production will take longer than the period of discontinuity. Public aid through the Fund to fight against COVID-19 has previously played a supporting role in bearing some of the fixed costs of companies and facilitating cash flow (Shannon, 2020).

All of these have consequences on the treasury state and will result in losses in tax revenues and a budget deficit that will worsen. In this emergency policy, all that Morocco can do in the immediate future is to guarantee a minimum of cash to avoid a monetary desert at the lower level and to avoid an implosion of solvent demand.

The problem lies after the medium and long term which will generate a tug-of-war within the Moroccan government between the proponents of a policy of austerity (prudential macroeconomic) and other aggregates; on the other hand, there are the proponents of the stimulus policy who claim that aggregates are at the service of people but not the other way around, thus widening the budget deficit by domestic debt in order to inject liquidity into the real economy and revive the economic machine. Then, there are the supporters who want to avoid the drift of the two visions and to acquire the appropriate financial means by reforming the status of the central bank of Morocco Bank Al-Maghrib. So, there is the policy of quantitative easing that makes the central bank a giant printer for the banking sector and the financial market and this does not cause inflation in the real economy. The other drift is to consider the central bank totally subject to policy and becomes an executive printer with a risk of hyperinflation. The intermediate solution proposed by another current (Achachi, 2020) is to create a financing channel between the central bank and the executive but which will be managed by an independent interface of both (the banking and financial sectors and the executive) which should assess the productive or non-productive nature of the financing needs of the state, i.e., whether the state needs financing for an economic development strategy or to put in place productive investments with its central bank,

but there is no way the central bank will finance operating costs.

An interesting study to be put on the account of Rachid ACHACHI (Achachi, 2020) proposes to create an economic parliament between both in order to head a great economic strategy of Morocco that goes beyond an economic recovery because Morocco is still struggling to develop an endogenous dynamic of economic development. Perhaps this crisis would be a revelation and an opportunity to make a qualitative leap forward and reconnect with new paradigms.

5.3 Social impact

Many impacts can be found about the economic domain that coronavirus has on the global market, but less about the social domain, while the containment of billions of people around the world is causing a huge social shock. The pandemic and containment have suddenly caused poverty hitting in many families, but what is worrying is that this is just the beginning. The crisis we are going through is not just a health and economic one, it has strong social implications and consequences both on individuals and organizations, which they put to the test. Among the most at risk (White & Van der Boor, 2020; Kar, 2020) are children, people living in a context of violence and in particular women, the elderly, the isolated, persons with disabilities, insecurity, those with mental disorders, people with addictions, people with severe behavioral problems, illegal aliens, inmates, people at risk of suicide, homeless people, etc. Containment could also be a source of onset or worsening of other morbidities (e.g. mental disorders, diabetes, etc.).

The coordination between the various actors of social, medico-social and health must be able to emerge strengthened from this crisis that our society is going through taking into account the findings of shortcomings that may have emerged during this period of confinement. This coordination is a decisive issue for social and medico-social supports, while the reality of solid support is sometimes undermined and challenged by limitations in access to various social services and the lack of human and material resources (High Authority for Health in France, 2020).

All social actors and medical-social mobilized and testified to great adaptability and agility in the context of a massive epidemic, followed by containment. To this end, we have seen, on the street and at home, a daily mobilization of volunteers and associations at the expense of their health security to lend a hand to precarious and sick families. Also, psychologists volunteer have mobilized to propose remote monitoring methods and have set up listening, telephone and proximity cells, based on the available means. Similarly, it has been noted that the municipalities have created places for homeless people.

Containment has been a major factor in the daily difficulties of children with behavioral disorders. It also exacerbated the psychological distress of people with autism. In general, families point to the lack of help and the loss of landmarks and activities that punctuated children's days.

There are also first lines of people who suffer socially from containment, the elderly for whom the punishment is twofold, they are closed to visits and risk of suffering from the sudden removal of their loved ones. Often affected by depression, the elderly alone, finding themselves with "forced containment" that can harm them more than it protects them. The elderly are not the only ones to suffer from containment. The "dependent", disabled or sick people who require daily care at home may not be spared either.

One point is the fear relayed by the media, which weakens vulnerable people by the often-offensive statistics and the amplification of the risks that could result from this pandemic. The information and images disseminated since the beginning of the confinement, are very violent and anxious for a large part of the public belonging to the social and medical-social fields but also for professionals.

With regard to justice, the reorganization of the "continuation of activity" does not really allow the organization of criminal emergencies or educational assistance. Consultations between the judiciary and other state services do not appear to have been effective throughout the country, particularly in cases of domestic violence.

Finally, the feedback and lessons learned from this first phase of the crisis lead us to believe that containment must adapt to the different types of public concerned, depending on the nature of the disability, the social situation, age, etc. areas of vigilance and recommendations for proposed developments needs to be identified. However, isolation and depression are the other consequences of coronavirus because containment leads to a limitation of contact while maintaining the social bond is essential to people's quality of life.

This problem will continue and requires to propose benchmarks to combine the necessary distance and social life by accompanying companies in the management of security by deploying new working and exchange methods between professionals, people and relatives and using the potential opened by digital and the conditions of its deployment must be explored.

So many leaders are now wondering how can they relieve their communities of the protection constraints that are in place? Who decides when safety is “safe enough” or what level of residual risk is acceptable? Mistakes are something that no government can afford. By applying a progressive community approach to easing blockages, adapted to the demographic and social stratifications of risk, much of the conjecture can be eliminated. Therefore, things must be done with extreme caution and gradually, in stages, priorities. If all its conditions are met, then it will be possible to get out of quarantine in a close time. An important step for the partial and gradual recovery of the national economy and thus the return to the usual social norms while maintaining the state of health emergency.

The operational plan is approaching for deconfining and should be done in several stages (Morin et al., 2020), starting with preparation and the eminent launch, followed by a rigorous consolidation and follow-up steps then a return to normal off specific points and ultimately, a culmination of a return to total normality. We can therefore envisage a medium- and long-term deconfinement (Parlak et al., 2020).

For the medium term, we must contribute to the conditions of this deconfinement, in an integrative approach to the health, social and medico-social dimensions by integrating the lessons of the crisis. This reflection must be based on an analysis of the different feedback from the experiences produced by the actors in the field.

For the long term, the forms of social work deserve to be questioned and renovated in the light of the crisis. Social work must undergo profound changes and evolve into new forms of trades. The need to project towards remote driving through digital solutions (Ganasegeran & Surajudeen, 2020). Specific recommendations should also be produced to guide the acceleration of the creation of these new forms of social work-related occupations. These professions must be carried out in conjunction with the public authorities in order to translate the consequences in the texts governing social activity.

6. Conclusions

We used real observations to assess the restrictive measures, monetary, fiscal policy measures, public and social health measures that have been adopted since the beginning of March, to face the pandemic's spread. Then we looked at the impact of these measures on health, economic and social activities. The result is satisfactory with a sense of confidence in the country, but sometimes a climate of mistrust can prevail through legitimate criticism of the way in which it is carried out in relation to lack of transparency and in relation to shambles and decisions that are misunderstood or misrepresented or misinterpreted. But overall in Morocco, the majority of Moroccans do not question the state's intention.

The implementation of these different measures in the socio-economic context of the Kingdom of Morocco and the effectiveness of the execution of all actions are to be put to the assets of the executive and the few satisfaction surveys carried out shows that 77% of Moroccans would be satisfied with the way the government manages the pandemic, but there are limits of the survey to discuss its reliability. First of all, there is the sample that should not be marginal and residual not reflecting the state of mind of the majority of Moroccans, in this case, the margin of error is important. There is also the logic of the class slices it means with whom we conducted the survey. But generally, in Morocco, a large part of Moroccans does not doubt the good intention of the state to do well; it can undermine the number of measures and above all, there is no political instrumentalization of this crisis. There is also paternalism that is unique to the Moroccan monarchy, which is beyond the partisan divisions of political parties and political rivalries, and that most of the decisions and outlines cited in the first part have been dictated by the King and subsequently declined at the executive and legislative level. We are in a form where it is the king who decides the state of emergency but does not constitutionally decide hence the effectiveness of the measures undertaken are not discussed but declined at the executive level quickly and efficiently.

Through this study, we hope to contribute to understanding the mechanisms and measures deployed by the Kingdom of Morocco to face the spread of the epidemic and their impact on health, economic and social lives. This has put Morocco among the nations that have managed the situation properly and effectively.

In conclusion, this analysis can be further improved, in terms of methods and accuracy, so we will be waiting for all other data and studies related to the subject in the framework of working with the research community to participate with our experiences in collective reflection to help our respective governments to make cleverer decisions.

Reference

- Achachi, R. (2020, April 20). *Re-politicize and re-sovereign the currency*. Panoramapost. <https://www.panoramapost.com/post.php?id=26142>.
- Benamour, N. (2020, April 6). *COVID-19: How Morocco is implementing a massive plan to support the economy and protect people*. Forbes France. <https://www.forbes.fr/politique/covid-19-comment-le-maroc-met-en-oeuvre-un-plan-massif-pour-soutenir-leconomie-et-protger-les-populations/>
- Bernard, P. (2020, April 10). *Borders, a false cure for coronavirus*. Le Monde. https://www.lemonde.fr/international/article/2020/04/10/les-frontieres-faux-remede-au-covid-19_6036200_3210.html
- Bouchnita, A., & Jebrane, A. (2020). A multi-scale model quantifies the impact of limited movement of the population and mandatory wearing of face masks in containing the COVID-19 epidemic in Morocco. *Mathematical Modelling of Natural Phenomena*, 15, Article 31. <https://doi.org/10.1051/mmnp/2020016>
- Bounani, A. (2020, April 20). *Morocco: this mask that COVID-19 makes the economy wear*. Le Point Afrique (Le Point.fr). https://www.lepoint.fr/afrique/maroc-ce-masque-que-le-covid-19-fait-prendre-a-l-economie-20-04-2020-2372079_3826.php
- Buheji, M., & Dunya, A. (2020). Foresight and Management of the Possibilities of Socio-economic Spillovers due to COVID-19 Pandemic. *Business Management and Strategy*, 11(1). <https://doi.org/10.5296/bms.v11i1.17044>
- Cabinet Deloitte, Institut de sondage OpinionWay, Agence Conseil 35°Nord (2020, May). *Africans and the COVID-19 epidemic: An eight countries study*. Deloitte SAS-Confidential Document. https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/Pages/deloitte-afrique-francophone/deloitte_les-africains-et-l-epidemie-de-covid-19.pdf
- Calsyn, M., Gee, E., Waldrop, T., & Rapfogel, N. (2020, April 26). *Social Distancing To Fight Coronavirus: A Strategy That Is Working and Must Continue-Center for American Progress*. <https://www.americanprogress.org/issues/healthcare/news/2020/03/25/482278/socialdistancing-fight-coronavirus-strategy-working-must-continue/>
- Cord (2020, April 13). *How is Morocco fighting an unprecedented global COVID-19 crisis*. Cord Magazine. <https://cordmagazine.com/news/how-is-morocco-facing-an-unprecedented-global-covid-19-crisis/>
- Ennaji, M. (2020, April 10). *In Morocco, the COVID-19 has dispelled the fear of relegating the religious to the back burner*. TRIBUNE. <https://www.nouvelobs.com/coronavirus-de-wuhan/20200410.OBS27355/tribune-au-maroc-le-covid-19-a-fait-sauter-la-crainte-de-faire-passer-le-religieux-au-second-plan.html>
- Finances News (2020, June 10). *Coronavirus: assessment and distribution of cases in Morocco on June 10*. <https://fnh.ma/article/actualites-marocaines/coronavirus-bilan-et-repartition-des-cas-au-maroc-du-10-juin-1>
- Fouad, E. (2020, May 6). *Mathematical modelling of the COVID-19 epidemic: Special case of Morocco*. <https://covidaba.com/wp-content/uploads/2020/05/Conclusions-de-le%CC%81tude-mode%CC%81lisation-mathe%CC%81matique-de-l%E2%80%99e%CC%81pide%CC%81mie-COVID-19-cas-particulier-du-Maroc.pdf>
- Ganasegeran, K. S., Surajudeen, A. A. (2020). Artificial intelligence applications in tracking health behaviors during disease epidemics. *Human Behaviour Analysis Using Intelligent Systems*, 141-155. https://doi.org/10.1007/978-3-030-35139-7_7
- Guessous, H. (2020, March 26). *Health Ministry to Distribute Chloroquine Free to COVID-19 Patients*. Morocco Word News. <https://www.moroccoworldnews.com/2020/03/297641/health-ministry-to-distribute-chloroquine-free-to-covid-19-patients/>
- High Authority for Health in France (2020, April). *Impact of the COVID-19 epidemic in the social and medico-social field*. Synthesis. https://www.has-sante.fr/upload/docs/application/pdf/2020-04/2020_04_21_contribution_csms_covid19.pdf
- Planning High Commissioner (HCP-Maroc), National Institute for Economic Analysis (2020, April). *Economic Note N°36 • INAC-HCP*. https://www.hcp.ma/Publication-Note-de-conjoncture-N-36-Avril-2020_a2502.html
- Health Word (2020, March 25). *Morocco to roll out antimalarials against coronavirus*. Health Word. <https://health.economicstimes.indiatimes.com/news/policy/morocco-to-roll-out-antimalarials-against-coronavirus/74802894>
- Kar, N. (2020). Covid-19 and older adults: In the face of a global disaster. *Journal of Geriatric Care and Research*, 7(1), 1-2.
- La, T. (2020a, March 23). *Coronavirus: Morocco deploys more than €3 billion to counter the virus and support the economy*. La Tribune Afrique. <https://afrique.latribune.fr/economie/strategies/2020-03-23/coronavirus-le-maroc-deploie-plus-de-3-milliards-d-euros-pour-contrer-le-virus-et-soutenir-l-economie-842990.html>
- La, T. (2020b, April 08). *COVID-19: Launch of the manufacture of 100% Moroccan artificial respirators*. La Tribune Afrique. <https://afrique.latribune.fr/politique/politique-publique/2020-04-08/covid-19-lancement-de-la-fabrication-de-respirateurs-artificiels-100-marocains-844674.html>

- Lesueur, J. T. (2020, April 21). *Covid-19: Moroccan optimization*. Le Point Afrique (LePoint.fr). https://www.lepoint.fr/afrique/covid-19-ce-maroc-qui-a-si-bien-optimise-ses-moyens-21-04-2020-2372314_3826.php
- Maloney, W., & Taskin, T. (2020). Determinants of social distancing and economic activity during COVID-19: A global view. *Policy Research Working Paper 9242*. <https://openknowledge.worldbank.org/bitstream/handle/10986/33754/Determinants-of-Social-Distancing-and-Economic-Activity-during-COVID-19-A-Global-View.pdf?sequence=1>
- Maneesh, P., & El Alaoui, A. (2020). How Countries of South Mitigate COVID-19: Models of Morocco and Kerala, India. *Electronic Research Journal of Social Sciences and Humanities*, 2(2), 16-28.
- Medias24. (2020a, March 17). *Coronavirus: Here are the regulated prices of hydro-alcoholic gels in Morocco*. <https://www.medias24.com/coronavirus-voici-les-prix-reglementes-des-gels-hydro-alcooliques-au-maroc-8432.html>
- Medias24. (2020b, March 19). *Hydroalcoholic gels: Several professionals involved in production*. <https://www.medias24.com/gels-hydroalcooliques-plusieurs-professionnels-impliques-dans-la-production-8580.html>
- Morin, H., Benkimoun, P., & Hecketsweiler, C. (2020, March 17). *Coronavirus: models show that containment of the virus will take several months*. Le Monde. https://www.lemonde.fr/sciences/article/2020/03/17/covid-19-les-scenarios-decisifs-de-modelisateurs-britanniques_6033393_1650684.html
- Moyou, E. (2020, May 8). *Number of coronavirus infections per country in the world*. Statista. <https://fr.statista.com/statistiques/1091585/morts-infections-coronavirus-monde/>
- Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., AlJabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International Journal of Surgery*, 78, 185-193.
- OECD. (2020, May 06). *The COVID-19 Crisis in Morocco*. Impact of COVID-19 in Morocco. OECD. <https://www.oecd.org/mena/competitiveness/The-Covid-19-Crisis-in-Morocco.pdf>
- Oliveira, G. M., & Rossi, M. I. D. (2020). COVID-19, Social Isolation and Human Stress: Comparative Behavior & Welfare. *New York Science Journal*, 13(5):14-22. doi: 10.7537/marsnys130520.03.
- Parlak, A., Lambert, J. H., Guterbock, T., & Clements, J. (2012). Population behavioral scenarios influencing radiological disaster preparedness and planning. *Accident Analysis and Prevention*, 48, 353-362. <https://doi.org/10.1016/j.aap.2012.02.007>
- Pygaglio, R. (2020, March 31). *Coronavirus, Morocco bets on all-chloroquine*. La Croix. <https://www.la-croix.com/Monde/Afrique/Coronavirus-Le-Maroc-mise-tout-chloroquine-2020-03-31-1201087121>
- Rhanja, C. (2020, May 02). *COVID-19: Morocco, awakening of the atlas lion?* France Soir. <http://www.francesoir.fr/politique-monde/covid-19-le-maroc-reveil-du-lion-de-latlas>
- Rehman, I., Khan, H., Zainab, W., Ahmed, A., Ishaq, M., & Ullah, I. (2020). Barriers in Social Distancing during Covid19 pandemic-Is a message for forced lockdown. *Journal of Medical Research and Innovation*, 4(2). DOI: 10.32892/jmri.222
- Samer, C., Curtin, F., Ing-Lorenzini, K. R., & Vetter, P. (2020, May 20). *Chloroquine, hydroxychloroquine and COVID-19: Pharmacological evaluation*. Geneva University Hospitals. https://www.hug-ge.ch/sites/interhug/files/structures/coronavirus/documents/hydroxy-chloroquine_et_covid-19.pdf
- Shannon, S. (2020, April 14). *Managing health and economic priorities in the context of the spread of COVID-19 in Africa*. Africa Center for Strategic Studies. <https://africacenter.org/fr/a-la-une/covid-19-en-afrique/>
- Vaudano, M., Baruch, J., Breteau, P., Dagorn G., Ferrer, Dahyot A., & Sanchez, L. (2020, May 05). *Coronavirus: visualise the evolution of the epidemic in France and around the world*. Le Monde. https://www.lemonde.fr/les-decodeurs/article/2020/05/05/coronavirus-age-mortalite-departements-pays-suivez-l-evolution-de-l-epidemie-en-cartes-et-graphiques_6038751_4355770.html
- Vigeo-eiris. (2020, April). *COVID-19 Moroccan Overview*. Vigeo-eiris.com. http://vigeo-eiris.com/wp-content/uploads/2020/04/C19-The-Moroccan-Case-Final-V-23_04_20.pdf
- White, R. G., & Van der Boor, C. (2020). *The impact of the COVID-19 pandemic and initial period of lockdown on the mental health and wellbeing of UK adults*. medRxiv preprint. <https://doi.org/10.1101/2020.04.24.20078550>.
- World Health Organization (2009). *WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care*. <https://www.ncbi.nlm.nih.gov/books/NBK144054/>
- World Health Organization (2019). *Global coronavirus research (COVID-19)*. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov>
- Yabiladi. (2020, April 15). *Mobility Trends :the respect of containment in Morocco illustrated by Apple*. Revue Yabiladi. <https://www.yabiladi.com/articles/details/92236/mobility-trends-respect-confinement-maroc.html>