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A generic Framework of Covid-19 Crisis Management in the Terminal ports: The case of Tangier Med Port

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Abstract - *The Covid-19 pandemic, deemed atypical of its nature, has spread aftershocks of various powers on the various ties of the global economy, in addition to its acute symptomatic impact on human health. The characterization of the impacts of this health crisis and the reactions of stakeholders in maritime and port communities during its spread is based on the maritime supply chain, which serves as a true barometer for assessing the health of economic systems at the international and national levels. Afterwards, the state of Tangier port Med against COVID19 is stated where we briefly indicate that according to the current health crisis world wild the situation in PTM is well handled economically and socially. In this paper the monitoring and analysing approach was developed to identify the factors affecting the system's operation as well as the various override options used by stakeholders in the maritime transport system during virus propagation. The paper aimed at developing a framework for terminal ports for health crisis management. As a result, digital use was one of the main results in managing the outbreak of Covid 19 in the digital age.*

Keywords: *Covid-19; port logistics; container terminal; supply chain; international trade; shipping*

1. INTRODUCTION

The COVID-19 outbreak entails unexpected consequences on the community, economy, and sanitary systems. With the contagion's exponential spread, the progressive limits on maritime activities in European countries and around the world have been imposed. However, each crisis of all types exposes a system's flaws and puts its toughness to the test. Afterwards, the world has seen a global crisis with a steepest economic recession since the Second World War. Therefore, this crisis put the world at unfavourable position and stand up to a serious obstacle to the potential course of trade talks and agreements. Besides, the expansion of the business cycles is very often accompanied by correction phases in which misallocations are done. In fact, the readjustment process touches the maritime shipping companies and port terminals as well.

As a solution to this problem, the international scientific community has quickly implemented information technology (IT) for continuous tracking of COVID-19 spread (Ting et al., 2020) [43]and integrated systems such as GIS system (Zhou et al., 2020)[57]. Initial evaluations of the impact of lockdown on the atmosphere (Collivignarelli et al., 2020[6]; Yunus et al., 2020)[55], culture (Sachser et al., 2021)[38], and economy (Ibn-Mohammed et al., 2020)[12] are projected to rise. The European Space Agency and NASA have used Sentinel5P data to deploy remote sensing technology to monitor changes in nitrogen dioxide emissions in the Po Valley (including Lombardy) and Wuhan, which are at the epicenter of the pandemic's spread (Liu et al., 2020)[17]. The pandemic COVID-19 had unprecedented effects on global supply chains and indeed the port and shipping industry. Moreover, any unexpected decline in customer demand has an immediate effect on shipping and port operations activity levels which in turns heavily affects the corporate strategies and business structures. Although the literature on health crisis and its impact on industry and economics has grown to this day, most of the attempts to tackle the effects of COVID-19 lockout steps have been overlooked by methods and research procedures.

The key effects of the COVID-19 pandemic on container ports, terminal operators, and shipping lines are discussed in the present paper. This study investigates in-depth the effects of the Covid-19 outbreak at temporal and spatial sequences on supply and demand shocks by answering the two following research questions:

- **(R1)** What are the COVID-19 short-term implications?
- **(R2)** How did Terminals in Tangier Med port react to these short-term implications?

These two questions are applicable to a variety of supply chain, container transport, and port strategic and organizational aspects. We discuss indicators and measures dealing with three interrelated aspects using primary and secondary sources to better understand the

consequences of the COVID-19 crisis: (1) data on container shipping activities, (2) port demand data, and (3) financial and strategy data for shipping lines and terminal operators. and terminal operator. Two main techniques were used for this study; (1) Benchmark the standard strategy (before covid19) with the current strategy (during covid19) applied and (2) Evaluate the financial and productivity progress, outcome and results of terminals in PTM in the case of covid19.

The remainder of this paper is explained as follows: Section 1 entails the introduction, Section 2 discusses the previous studies regarding the impact of COVID-19 on the supply chain, Section 3 states the methodology used for this research paper, Section 4 indicates the results and the discussion of the research and last the conclusion which includes the resume of the paper`s outlines and limits.

2. GENERAL FRAMEWORK

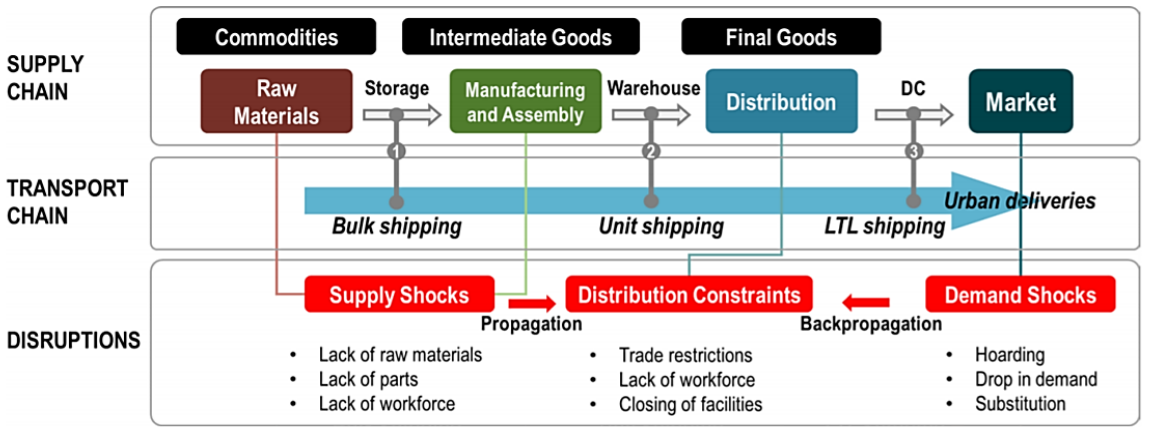
2.1 General perspective : impact of COVID-19 on the supply chain

Supply chains can be extremely complicated, with several stages ranging from the provision of intermediate goods to the consumption of final goods in consumer markets. There are three basic ways in which supply chains are disrupted (Fig. 1). Supply shocks are abrupt changes in the supply of raw materials, components, and manufacturing capacities that occur unexpectedly. It's not just that prices can rise; critical components can become unavailable due to a shortage of raw materials, parts, or the labor required to procure them. Depending on the current buffer, such as electricity, grain, parts, or raw materials stockpiles, the supply shock can take some time to manifest.

Economic and financial disturbances are common occurrences that interrupt supply chains, with pandemics being low risk but high impact events (Luke and Rodrigue, 2008)[18]. The most common are recessions, which range in severity from light to extreme, with mild economic decline (e.g., GDP) lasting a few months to severe, with severe economic decline lasting many years (commonly known as a depression). There is a wealth of economic research on the effects of recessions on trade, industrial development, and consumer behaviour (Bems et al., 2010)[4]. Consumption, commerce, and transportation activity will all suffer as a result of this magnitude. The form of products and related services affects changes (declines) in consumption habits (demand). Consumer goods expenses normally account for two-thirds of GDP in advanced economies. The most resilient commodities are basic goods (also known as essential goods, such as food and household items) and luxury goods (fashion items). Recessions have a minor effect on respective supply chains.

The demand for durable goods (cars, appliances, computers), discretionary goods (electronics, apparel), and capital equipment (ships, vehicles, machinery, and port infrastructure) can all be affected by recessionary powers. Consumers lose a significant portion of their discretionary spending power during recessions, meaning a delay in spending, especially on durable goods. As a result of the drop in demand, businesses reduce their capital equipment investment. In addition, they have reduced their inventory levels to minimize risks.

Figure 1 : Disruptions on supply chains impacts (Notteboom and Yap, 2012)



The situation for COVID-19 involves an external shock that affected all elements of the supply chain at roughly the same time. As a result, the indicators have a high degree of synchronism at the start of the pandemic. They all went down at the same time and to the same degree. However, the indicators quickly recovered within three months, confirming the thesis of temporary disturbances and delayed demand. However, The COVID-19 crisis has been developed in several stages in the supply chain. Firstly, in early 2020, there was a supply shock in China,

with lockdown measures resulting in a de facto extension of sharply reduced Chinese output over the New Year's timeframe. Between mid-January and early March 2020, the lockdown affected the majority of the workforce and severely limited the industrial base (Notteboom et al., 2021)[27]. Simultaneously, due to an increase in demand and the diversion of inventories, certain industries (pharmaceuticals and medical equipment) experienced shortages (Organization (WTO), 2020). The second phase, which began in mid-March 2020, consisted of a 'global' demand shock with supply chain back propagation (Baschuk, 2020)[3]. Due to reduced consumption, industrial confidence and decreased retail operation, various lockdown measures introduced around the world resulted in a drop in global (derived) demand. In the first half of 2020, service operations associated with the provision of transportation facilities, such as tourism, would have almost disappeared. But for a brief spike in inventories due to hoarding, demand for most consumer goods fell sharply. Moreover, the shortages in workforce have relatively uncovered the last-mile delivery weaknesses (e.g., absenteeism in trucking). The lower level of economic activity, along with uncertainty about the road to recovery, resulted in a sharp drop in the price of many commodities. The transition to e-commerce hastened a process that was already underway, putting more pressure on online retailers. Due to the strict lockdown, the segments of the luxury sector, mainly tourism, have almost disappeared causing significant supply chain disruptions. A highly unpredictable situation of rapidly increasing unemployment, government bailout packages, and market instability was followed by a recovery that took hold in the third quarter of 2020, with highly uncertain conditions created by a new wave of COVID-19 cases and restrictions in countries around the world.

These statements indicate that we are still a long way from reaching the end of a clear and consistent recovery and returning to normal demand patterns. Since September 2020, there has been a strong move toward restocking inventories at distribution centres and stores in many parts of the world (including North America). However, once the restocking is complete, supply and demand will be rebalanced to a "new standard." The recovery period could coincide with a rise in the risk of protectionism to boost domestic production. Depressed demand and high unemployment would be prevalent in many economies. Nearshoring and reshoring strategies are also being considered to minimize reliance on overseas manufacturing, grow critical economic activities at the regional/local level, and improve supply chain resilience (Notteboom and Haralambides, 2020)[29]. COVID-19's singularity has yet to be determined.

2.2 Specific perspective: impact of COVID on ports

Container shipping is a high-capital-intensive industry with properties that are either owned or rented. Container shipping lines' operational and commercial performance is dependent on asset management for the feet they own or run (Wadhwa, 2020)[50]. The literature has addressed the container shipping market's instability and volatility, as well as the resulting need for resilience, but an evaluation of COVID-19's ramifications is incomplete and will become more apparent as the situation worsens (Méndez Roca, 2015)[22]. Container shipping companies are being encouraged to develop technologically and process-driven creative technologies, as well as value development and business model developments, in order to create a more competitive and resilient shipping industry (Yang et al., 2019)[54]. As container lines changed their strategies to deal with the decrease in volumes in the first half of 2020, freight prices did not fall. In October 2020, freight rates on the Asia-Europe trade hit a four-year high, while rates on the Asia–Med trade hit a five-year high. In September–October 2020, transpacific concentrations remained at all-time highs. Since week 21, about ten weeks after the WHO declared COVID-19 a pandemic on March 11, 2020, the Shanghai Containerized Freight Index has shown a significant increase in freight prices well above 2016–2019 levels (week 11). The SCFI index remained higher than in the previous four years, even after the Chinese lockdown in early 2020. Volumes and prices soared in the third quarter of 2020. Despite the lower liftings, most cruise lines posted H1 earnings that were much higher than anticipated. Sharing slots on vessels, a sluggish orderbook, returns of chartered tonnage to lessors, low bunker fuel rates, and, to a lesser degree, the lack of legislation enabling liner shipping lines to maintain and monitor flexibility all helped to promote this (Pelagidis and Haralambides, 2020)[34]. The resilience of demand for basic goods, especially food and medical products, has been observed in global ports since the outbreak of the COVID-19 pandemic. Even after the pandemic, shipping lines and their alliances (i.e., The Alliance, Ocean Alliance, and 2M retained network integrity and relied on blanked sailings to meet declining demand (Wang et al., 2021)[51]. The first wave of void sailings was produced, with 36 percent of Asia to Europe sailings and 28 percent of transpacific head haul capacity being withdrawn. In March, national lockdowns in destination countries and consignees' unwillingness to receive cargoes caused the cargo scheduled to be shipped from the Far East to be further delayed. The effect of these blank sailings could only be seen in European ports by March 2020, due to the sailing time on the Europe–Far East trade. Carriers were withdrawing up to 20% of their network capacity on the main trade lanes and idling more than 2.7 million TEU of feet capacity, or more than 11% of the world container feet, in April/May 2020, when

lockdowns and constraints on economic operation in Europe and North America halted industrial development, with consumer and business demand hitting record lows. In May, the Asia–United States route's blank sailings rate reached 19 percent of cancelled capacity (47 out of 249 calls were blanked). As a result, the percentage of vessels laid up has risen to levels comparable to those seen in 2009 (Song, 2021)[41].

The average vessel utilization rate, on the other hand, did not fall. Between April and June 2020, blank sailings meant 20 percent to 50 percent fewer vessel calls for certain ports, but the effect was more noticeable on the key trade routes (e.g., Far East–Europe) and not so much on other trade routes. Blank sailings had a significant effect on call sizes and, in particular, the amount of containers handled per call, all of which presented operational difficulties for many ports. Carrier reports in early June 20208 suggested a cancellation rate of at least 20% of originally scheduled sailings for Q3 2020 (Yamagishi et al., 2020)[53]. Blank sailings were curtailed in June/July 2020, as demand on some trade routes resumed as COVID-19 controls in major North American and European markets were relaxed. The recent increase in freight rates is directly related to a peak in demand (i.e., inventory restocking). To meet rising demand, shipping lines sharply reduced the number of blank sailings: the share of idle vessels in total feet capacity fell from 11.6 percent in May 2020 to just 1.8 percent in October 2020. Carriers further limited vessel capacity by reducing order books, increasing vessel scrapping operation (including many post-Panamax vessels with a capacity of about 10,000 TEU being sent to scrapyards), and using the Cape route around South Africa instead of the Suez Canal route on occasion. In addition to blank sailings, shipping lines experimented with new operation and storage strategies in the early months of COVID-19 to eliminate cancellations. They introduced “suspension of transit,” “detention in transit,” or “storage in transit” clauses to delay the flow of trade for shippers who were unable to accept deliveries due to the crisis, enabling consumers to change delivery dates (MSC, 2020). This offered flexibility and significant cost savings by allowing shippers to better manage storage costs at the time of booking while tailoring the delivery date to their specific requirements. The container shipping feet composition, which has been characterized by the entry of a large number of very large container ships into the market in recent years due to economies of scale, imposed a very specific restructuring of services that encouraged increased utilization of large ships. 10 Slow steaming was already the rule, and there was no need for speed reductions any further. In the first half of 2020, these steps, combined with low bunker rates, had a positive effect on operating margins (Doumbia-Henry, 2020). Operating margins were positive for all major carriers. Longer term, the expected slow economic recovery and ongoing gradual reorganization of global supply chains (e.g., nearshoring and reshoring) may force shipping lines to rationalize services on major East–West trade routes while bolstering intraregional shipping networks. This pattern had already started, but in the post-COVID period, it seemed to be speeding up. The effect on containerized food (such as fruit, dairy products, canned food, and perishables such as fish, vegetables, fruit, and meat) was minimal, as the recession had a noticeable impact on the consumption of (supermarket) food provisions (Barua, 2020). Also supermarkets in some countries had to turn to online sales of non-essential items like electronics or clothes during the lockdowns. Governments needed to ensure that retailers who were forced to close played on an even playing field. Changes in consumption and inventory levels influenced the volumes of consumer products exported, which were mild. Intermediate commodities, such as chemical materials and components used in products including paint, chemicals, and medical devices, as well as capital goods (e.g., machinery) and durable consumer goods (e.g., automobiles, televisions), have all decreased drastically (Verschuur et al., 2021)[49].

Development, transportation, and trade (supply) are all changing as a result of a series of events (Handfield et al., 2020)[10]. The first of these occurrences involves future indices including stock market valuations, commodity prices, and freight rates—indicators that respond rapidly to changing market conditions. Manufacturers are encouraged to reduce their production and the demand for parts and raw materials as a result of these indicators (repricing of inputs and properties, as well as the expected decrease in demand). Depending on whether they are selling disposable goods or capital equipment, these changes take place in different ways in different industries (Maliszewska et al., 2020)[19]. Container volumes and foreign trade then confirm the resulting collation (Barabari and Moharamzadeh, 2020)[1]. The current recession may have an impact on market structure as well. The current level of liner shipping consolidation is high, with the top ten shipping lines controlling 91.5 percent of total feet capacity and all major carriers being members of an alliance. Although there has been some limited M&A activity (e.g., MSC's 49 percent acquisition of the Ignazio Messina shipping group), there are no imminent indications that a new wave of mergers and acquisitions among larger carriers would occur in the short to medium term (Oyenuga, 2021)[33]. The medium-term demand outlook is highly unpredictable, with long-term forecasts predicting carbon taxes and new fuel forms. Some shipping lines may be able to take advantage of their strong financial position to place more vessel orders and diversify their portfolios by buying regional niche carriers. If reshoring and nearshoring patterns escalate in a post-pandemic climate, intraregional shipping services may become more relevant. Several container lines may

also use their newly found financial strength to increase their emphasis on vertical integration by increasing their presence in inland logistics and digital transformation, as well as continuing to green their footprints (Oord et al., 2020)[31]. COVID-19's effects on ports were a brief jolt, with a smaller scale and shorter length than originally expected. This occurred as a result of the adaptability shown by both shipping lines and partnerships, as well as container ports. Container ports' responses have been multifaceted, with some undergoing significant reorganization in their operations as shipping lines handled their usable capacity efficiently. These changes included social distancing, longer shift changeover, cleaning equipment, and operational vehicles (ship-to-shore cranes, trucks, hand, and front loaders), rotation schemes, and a lower number of dockworkers, as detailed elsewhere (UNCTAD, 2020a)[46]. Collaboration and collaboration among stakeholders in combating risks and improving resilience—including the use of existing contingency plans and increased use of technology (digitalization)—enabled fast responses to the crisis. The willingness of ports to enforce immediate and compensatory financial steps, such as cash for early payment of providers, which was disrupted by lockdowns and suppressed demand, or overdue payments by some of their customers, also helped to alleviate the crisis's negative effects. Even at the height of the crisis in April–May 2020, company activities and maritime supply chain operations were able to continue (Zheng et al., 2021)[56]. The automation of facilities and the digitalization of port group exchanges have been crucial, allowing ports to efficiently respond to the crisis's and staff shortages' conditions. Container ports, however, have faced additional difficulties as a result of shifts in port service demand since the beginning of the COVID-19 crisis (Zhuckovskaya et al., 2020)[58].

Figure 2 : Global container vessel calls per week 2020 versus 2019 (UNCTAD, 2020a)

The lower number of port calls has been the first of these additional difficulties. Container vessel calls in ports around the world fell by 3.6 percent in the first 30 weeks of 2020 compared to the same time in 2019. While this timeframe includes the week with the largest decline, the differences in vessel calls were marginal (1.1 percent) during Q1 2020, when the epidemic was more localized. The outbreak of COVID-19 in China in mid-February (week 7) resulted in 15.5 percent fewer vessel calls than the same week in 2019 (Wang et al., 2020)[52]. With millions of people in quarantine across the world and millions of workers at risk from the COVID-19 pandemic, the consumption of vital products such as food and medical supplies has taken precedence. As a result of the dramatic drop in demand, trade is affected, and main container routes are negatively impacted (Koyuncu et al., 2021)[16]. A 30 percent and 32 percent reduction in world trade, respectively. The number of containership calls was less affected by the COVID-19 pandemic than the number of containers treated in ports. The outcome is noteworthy because it occurred at a time when picking up import cargo from the port was especially difficult, if not impossible, for many shippers and forwarders due to transportation constraints in the hinterland (March et al., 2020). This was particularly true of cross-border crossing problems caused by new measures, such as a truck driver shortage and the temporary suspension of rail and barge services. Shipping lines began using some of the world's most important transshipment hubs (such as Bremerhaven, Busan, Panama, and others) as advance yard storage to encourage shippers to start moving goods early in anticipation of a demand recovery (MSC, 2020).

Shipping lines that provide flexible storage solutions to shippers not only reduced cancellations, but also helped to reduce congestion in ports of discharge, increasing efficiency by bringing goods closer to distribution networks. Shippers that generate significant container traffic were among those that made no immediate commitment to collect and transport orders that were completed, processed, and in development. Indeed, until the end of May, 32 container ships departing from ports in Europe and North America chose to depart from the Suez (Huveneers et al., 2021)[11]. And in response to this rout of the container ships which brought 1/3 of the ships and half of the overall load to the Suez Canal in 20196, the authorities of this canal granted a series of discounts ranging from 6 to 75% for the benefit of this type of vessels according to their points of departure, during the period from the beginning of April to the end of June. Alphaliner, an organization specializing in maritime expertise, has just reported that until May 26, 2020 there are 15 container ships leaving from ports in Europe and North America have taken the destination of the Cape of Good Hope, even if they have been creditworthy to benefit from the Egyptian canal toll reductions (Kipgen et al., 2020)[14].

3. METHODOLOGY

3.1 Port Crisis Management

Terminal ports are preliminary a complex network with multiple underplaying subnetworks (Cheng et al., 2010)[5]. Adding the complicated nature of pandemics, the results is an extremely tough situation to be managed (Oord et al., 2020)[31]. Hence, the need of a holistic approach in needed to assess the readiness and preparedness of terminals port in the cases of crisis. Through the literature multiple studies tackled this subject. Some studies started by discussing the difference between risk management and crisis management (Drennan et al., 2014[8]; Scholes, 2000)[40]. Per the purpose of the study and in order to englobe the complexity of the subject, only papers discussing crisis management and crisis preparedness and readiness were studied. To date, the majority of crisis analysis has concentrated on a particular area of investigation. Švarcová and his colleagues Suggested a crisis management system approach with adequate training and experienced staff (Švarcová et al., 2016). From another perspective, Vardarlıer studied the strategic readiness aspect especially for human resources management and the approach he used is comparing classic and modern ways to assess the effects of health crisis on human capital (Vardarlıer, 2016). In a recent study, Sambala and his colleagues used a checklist to assess the preparedness of 47 African countries again crisis and they evaluated the plan implemented by those countries (Sambala et al., 2018)[39]. In a very recent study, a group of acedemics They draw on extensive data from the COVID-19 pandemic survey and interviews. Their study shows that service models and accelerated digital and advanced services are becoming increasingly important and they presented a four step modern model for COVID29 crisis management (Rapaccini et al., 2020)[36]. Last but least, Ning and partners introduced China`s model for tackling the COVID-19 emergency governance epidemic in public health. A series of mechanisms have been developed based on goals and values, including the establishment of an overall government response and accountability platform, multi-sector collaboration platform for rapidly developing epidemic emergency capacity, social action involving social organisations, and the involvement of citizens in the prevention and management of epidemics (Ning et al., 2020).

In this sense, earliest study regarding crisis management was that of Reilly`s. The overall crisis management mechanism is depicted in this model. Selections of five tasks are included in the structure for successful crisis management. Many concepts from the cognitive psychology paradigm are used in this model. Effective crisis management relies heavily on the processes of problem perception, analysis, and decision making (Reilly, 1993)[37]. Elsubbaugh and his colleagues proposed a revised crisis preparedness Model which is applicable in both developed and developing countries (Elsubbaugh et al., 2004)[9]. Martagan and his colleagues took the subject beyond previous studies where he proposed a simulation model of port operations during crisis conditions. Their model assesses and reports on the supply chain's success under various re-routing strategies. The data can be analysed to determine the best re-routing technique for reducing traffic congestion and delays during a crisis. Various decision makers, such as port managers, ocean carriers, and transportation firms, may use the model to make strategic decisions (Martagan et al., 2009)[21]. According to a recent report in maritime knowledge, they presented a model to assess port preparedness towards crisis. They stated that crisis management involves dealing with threats before, during, and after they have occurred. The three phases in any Crisis Management are: (1) The diagnosis of the impending trouble or the danger signals, (2) Choosing appropriate Turnaround Strategy and (3) Implementation of the change process and its monitoring (Knowledge maritime, 2018)[15].

In a recent study, a plan for emergency preparedness is detailed in the case of terminals. The authors assert that if a terminal is to respond to emergencies in a timely and efficient manner, it must have a detailed and well-practiced plan. They've discussed the development of terminal emergency response plans, as well as the provision of resources and training to back them up (OCIMF and CCNR, 2010). WHO presented in a recent

study a plan designated specifically for health crisis preparedness and health regulation (Isla, 2019)[13].
For the purpose of this study, a container terminal was studied and taking under consideration the complexity of the situation and uncertainty of the pandemic threats and consequences the simulation model was chosen as a method.

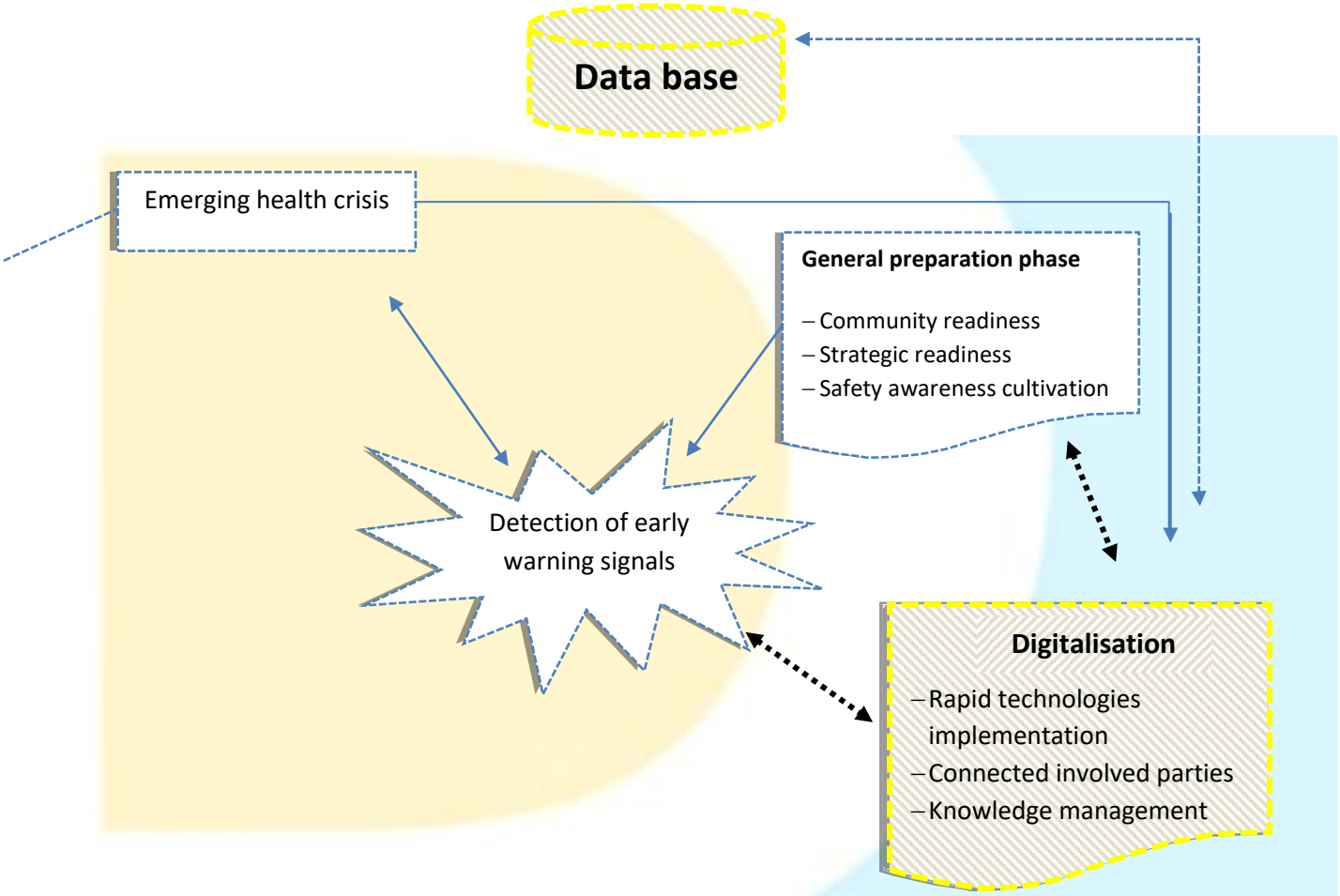
3.2 Research Context

The essence of this research is both descriptive and prescriptive. The methodological choice is oriented towards a qualitative and quantitative approach. It has used two basic and complementary research methods to provide in-depth insights on the crisis preparation process in a crisis-ridden market; a questionnaire with semi-structured interviews with different port actors of Tangier med. Administered with interview guide to managers at within the port of Tangier med, which included questions open discussions on the impact of covid-19 on the port industry as well as measures to limit the spread of the virus and revive the port sector and even questions relating to the port's responsiveness to the pandemic and the weight of the actions taken. The data from the questionnaires supports testable generalizations across the industry, while the interviews provide insights into the culture and behaviours of business leaders, which are crucial for creating a suitable crisis preparedness model.
In addition, the questionnaire data have been collected from 30 managers and interview data from 50 managers across Tangier Med port. Data from various sources are combined to provide substantial evidence for the extended model's various phases. Managers' willingness to be interviewed on a sensitive subject like organizational crises, which could be related to management deficiencies, was sometimes limited. Confidence had to be won over time, and great care had to be taken in phrasing questions and preserving anonymity, despite the fact that some people still refused. Despite the fact that obtaining permission to tape interviews was difficult, it was important to take thorough notes. Interviewees were chosen based on their role within the company, with a focus on senior executives involved in strategic planning as well as middle and senior executives in functional departments.

3.3 Conceptual Model - An Extended Crisis Preparedness Conceptual Model

For the sake of the model verification, a holistic model from a previous study is going to be verified in Tangier Port Med terminals. There are four main phases to this model. The first step is general preparedness, which requires (1) strategic crisis preparation, (2) a balanced crisis management culture and (3) Safety awareness cultivation. The second step is the detection of early warning signals. There third step is the basic preparedness process, also known as crisis management, which requires (4) rapid decision-making, (5) resource mobilization, and (6) successful knowledge flow. Finally, the fourth step is increased use of digitalisation which is based on two elements (1) quick implementation of missing technologies, (2) connect the technologies implemented and (3) knowledge management.
Below figure depicts a modern extended crisis preparedness model based on Reilly's model from 1993. After examining the results of questionnaires and interviews another phase was stated as crucial in case of crisis especially in case of health crisis and its relation to the economy and continuity of supply chain.

Figure 3 : Research proposed model (Authors` own illustration)



This is one of the most pressing problems, and we've committed significant resources to finding a solution. However, as one manager remarked that currently exploring how artificial intelligence can use historical data to forecast events and accelerate decision-making. Data-driven decisions, identifying patterns, and forecasting events can all help us strengthen health crisis readiness. A network can be created for more effective freight flows and transportation movements on land and at sea by doing so.

There is an agreement upon all the managers involved in this study that enhanced digitalisation will benefit everyone. Nevertheless, if it is to produce the desired outcome, more people in the transport chain need to link into common systems and share information with each other.

The proposed model integrates the six practices needed to effectively plan for and respond to organizational crises. The center of the crisis preparedness model is made up of these phases and their related activities. The model complements Smits and Ezzat's behavioural work by building on Reilly's characterisation and taking into account the logical sequence of crisis preparedness (2003). Second, it acknowledges the cultural forces that are likely to play a key role in crisis preparedness in a developing country such as Morocco.

4. RESULTS AND DISCUSSION

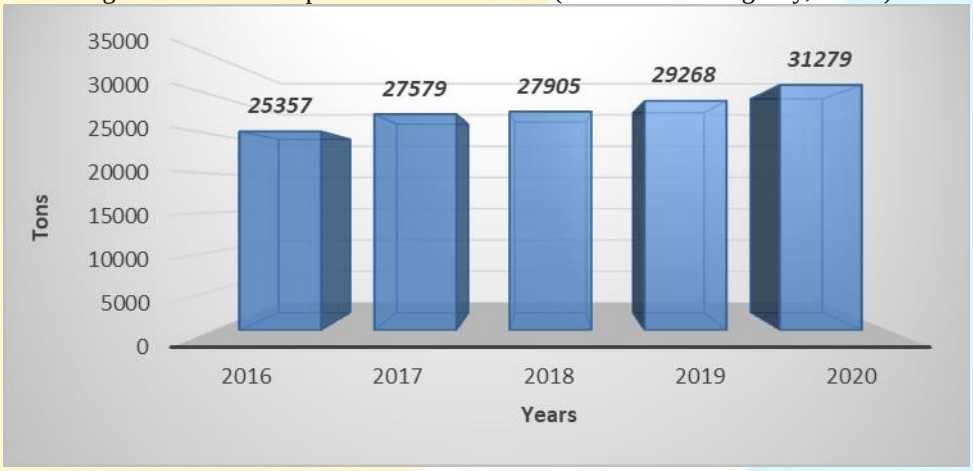
The confinement decreed by the competent authorities required the closure of the country's borders. Like the airports, the port authorities represented by the National Ports Agency (ANP) and the Tangier Med Port Authority (TMPA) have urgently cancelled the berthing of ferries and cruise ships, while complying with the maintenance of traffic of goods as stipulated by the measures to be imposed in such circumstances of health crises. The latest results communicated by these two authorities show that the port activity took place during this first quarter in a normal way, even it recorded an increase compared to the same period of last year. The activity of ANP ports, the consolidation of freight growth.

In its monthly activity report for the month of April, the ANP announces, - at the level of the ports it manages - the realization of a cumulative traffic of 31.3 million tonnes

between January 1 and April 30, 2020. The ports concerned continued their increasing trend to mark an increase of 6.9% compared to the same period of the previous year (Figure n ° 4). Exports which were supported by a rebound in the traffic of crude phosphates and fertilizers recorded during this period an increase of 8.4%, and imports grew at a rate of 6.3% due to the increases in the country's purchases of charcoal, but also cereals and animal feed to cope with the effects of this year of very pronounced drought. Cabotage traffic increased by 1.6%, mainly due to the increase in the transport of hydrocarbons (National Ports Agency, 2020a)[24].

It turned out then, that in the midst of the health crisis linked to the spread of Covid-19, the country's various commercial ports continued to operate at full speed. On the other hand, faced with the obstacles imposed on international road transport and to support agri-food exports from the Souss-Massa basin to the European market, a new shipping line was launched on March 21, 2020 for the delivery of reefer containers from Port of Agadir to Port Vendres in the South of France.

Figure 4 : Moroccan ports Traffic evolution (National Ports Agency, 2020a)



On another hand, at the beginning of May, the physical distancing barrier measures recommended for the control of the spread of the virus encouraged the port authorities to give more dynamism to the process of generalization of dematerialization by digitization of transit procedures. port from end to end. From May 4, electronic management of the “Good to Deliver” via the Portnet “Single Window for Foreign Trade Procedures” has become mandatory, and a new version of the Smart Gate application is deployed to facilitate collection. Containers (National Ports Agency, 2020b)[25].

Before reaching this stage, the one-stop-shop PortNet developed from March 15, 2020 a plan for the continuity of its services by teleworking to avoid any movement of people or exchange of paper documents. The approach adopted concerned: the subscription and filing of subscription files online; electronic payment of invoices from ANP, PortNet and industrial product control offices; online filing of renewal requests, addition of bank identity statements, and addition of users or other administrative requests; assistance and complaints (PortNet, 2020)[35].

Even though blank sailings had a negative effect on weekly services, Tangier Med (Morocco), a major transhipment port in the Mediterranean Sea, continued to increase its liner shipping connectivity levels. Tangier Med saw a rise in the number of liner shipping services (18.6%), ship calls every week (18.3%), deployed ship carrying capacity (27.8%), and the maximum size of container ships calling at the port during the first quarter of 2020. (15.5 per cent). The decline in the number of operators was the only negative factor (-7.2 per cent).

Table 1 : Liner shipping connectivity of Tangier med port between 2019 and 2020 (UNCTAD, 2020b)

	Shipping services		Weekly Port Calls		Shipping operators		Max TEU		Deployed Capacity		Direct Calls	
	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2
Tangier Med	18,9%	0%	18,3%	-0,5%	-7,1%	-7,1%	15,5%	23,7%	27,8%	19,1%	6,1%	-4,2%

The TMPA, for its part, has disassociated itself from national and foreign conventions in order to ensure the protection and security of goods and citizens passing through its port terminals. The port complex's numerous facilities were mobilized to manage not only the transhipment movement of containers originating from or bound for the global network of ports to which it is connected, but also the fluidity of the national supply chain. Both types of products are exported and imported (TMPA, 2020a)[44].

For good coordination with similar ports, from May 7, 2020, the TMPA liaised with the Port Authority of Algeciras Bay to ensure the continuity of links between their two hubs. In this coordination, emphasis is placed more particularly on international road traffic, for trade, import and export, between Morocco and the European Union. These exchanges include industrial, agro-food, health and pharmaceutical products… flows. and thus, allow the maintenance of the respective supply chains (TMPA, 2020b)[45]. In the same context, from May 29, 2020, the port of Tangier Med joined the initiative of the port of Singapore alongside the major international port hubs, to commit to guaranteeing the continuity of global logistics chains (TMPA, 2020b)[45].

The same effort to maintain the normal functioning of the port terminals concerned the activities within the Logistics Zone and the Activity Zones installed around the port complex. At the beginning of June 2020, the good performance of the Tangier Med hub has just been confirmed by a recent study on port attractiveness in the western Mediterranean. "Thus, Tangier Med has accumulated more than half a million TEUs of maritime capacity from China in April alone, or as much as Marseille and Barcelona combined" 18. This situation could well restructure the western port hierarchy. Tangier Med's accessibility levels seemed to have fared well during the pandemic. The pandemic, on the other hand, has had serious negative consequences for Mombasa's port.

Table 2 : Activities for Crisis Preparedness that were considered significant by the Literature Review

Crisis preparation activities	No. of statements	Per %	No. of managers
Creating a system that is crisis management responsive	20	16.8	7
Implementing strategic planning, building teams, and providing crisis management instruction to employees.	12	10	4
Ensuring a smooth flow of information, efficient internal and external communications, and the implementation of information technology	23	19.3	8
Tracking or finding possible issues in the firm's internal and external environments, following up on new developments, investigating organizational vulnerabilities	10	8.4	5
Recognizing the importance of making swift decisions and taking action.	18	15.1	6
Making available a variety of tools for dealing with crises	25	21	10
Ensuring the productivity of managers' and employees' day-to-day operations	8	6.7	4
Delegating authority or decentralizing power.	2	1.6	3
Organizing and engaging crisis management managers	1	0.8	3
Total	119	100	50

The findings outline the managers' statements and reflect their perspectives over how crisis management can be carried out in an optimal situation. These stand in stark contrast to the COVID19 experiences they mentioned in terminals and ports, which have served as the foundation for the extensions we've made to existing crisis preparedness models to meet the circumstances encountered in both the developed and developing worlds.

Table 3 : Ranked Crisis Preparation Activities (questionnaire results)

Activities	Crisis preparation model activities	Per %
A	Deployment of advanced technology	98.3
B	Establishing a smooth information flow	95.4
C	Early warning alert detection	94.5
D	Speeding up of decisions	94.2
E	Resource mobilization and deployment	80.7
F	Implementation of a strategic plan to help with crisis management	69.1
G	Fostering a constructive culture to assist with crisis management	55.6

The examination of above-mentioned activities was evaluated from terminals in Tangier med port based on answers of executive managers. The managers were handed question to evaluate the importance of each activity and its implementation in their company. The importance scale was rated from very important to neutral. The results are summarized in table below:

Table 4 : Importance of activities and percentage of its implementation (questionnaire results)

Activity	No. Managers	Very important (%)	Important (%)	Not important (%)	Neutral (%)	Real (%)
A	20	40				80
	18		36			55
	13	26				40
B	28	56				92
	12		24			60
	10	20				30
C	18	36				70
	12		24			30
	12			24		10
	8				16	5
D	31	62				40
	14		28			60
	3			6		30
	2				4	45
E	27	54				80
	19		38			40
	4				8	10
F	34	68				88
	16		32			75
G	19	38				70
	16		32			35
	13			26		30
	2				4	45

Since coping with crises should be part of an organization's overall strategic thinking process, it cannot be isolated from strategic thought patterns or the entirety of ongoing organizational activities. As a result, the bulk of the strategic steps taken by Tangier port med terminals to deal with crises were aimed at enhancing their daily operations. Respondents to the survey identified seven acts that they felt fit into this category:

- Providing an investment in the management of the pandemic
- Implementation of the business continuity plan and
- Taken the necessary sanitary provisions
- Services remain operational to ensure sea calls in the best conditions
- Port activities are continuing normally, especially the traffic in import / export containers and in transhipment, truck flows in import / export, liquid and solid bulk traffic
- Continuing digitalization dynamics: dematerialization through the port community system

As a result of the Corona outbreak, the majority of ports throughout the world have been forced to re-examine their routines. Greater use of digital tools has been part of the solution in an effort to maintain an efficient workflow. Increased automation and digitalisation were a top priority at Tangier med port. The majority of the initiatives that have already been introduced have proved to be particularly constructive during the COVID-19. Tangier med port's automated infrastructure has resulted in a major decrease in administration and face-to-face communication when it comes to granting work permits to contractors. The supply chain was able to keep going thanks to the automated operations provided by terminals in the current COVID crisis. It ensures a more effective operating procedure by reducing physical activity. As most executives stated that, it's mainly a matter of increasing productivity and visualizing freight and traffic flows to and from the port.

5. CONCLUSION

The coronavirus outbreak has sent shockwaves through every sector of the economy. Maritime transportation was also impacted by the health crisis, but to a lesser extent than other industries. The aim of our article in this context was to see how port terminals could be equipped to deal with crises like the COVID-19 f in the Tangier Med seaport.

Our search revealed the feasibility of applying the modified conceptual model as proposed by Reiley in earlier times (Reilly, 1993), this model regarding crisis preparedness need to be coped with current challenges. Based on the data collected, digitalisation was not a core component of the model while it was agreed by all the

sample questioned that terminals could not and cannot survive crisis and especially health crisis without the aid of advanced technology.

The effectiveness of the proposed approach was verified in a real-world case study and all the components showed significancy. From one hand, the model showed that maintaining a high level of productivity during health crisis is ensured and from the other hand, controlling the propagation of the virus in the terminals community is guaranteed. Furthermore, the model attributes to an effective transition of working from home possibilities. However, the geographical limitation of the research was an obstacle to verify the assumption regarding the model proposed. Further quantitative studies may enhance the understanding and generality of the proposed model. The current study did not take into account the rivalry between terminals not the connection of each terminal to other port and the impact of this connection on the productivity, hence for further and future studies other factors can be taken into consideration to test the validity of the model.

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