

The COVID-19 Pandemic: What Impacts on the World Economy and the International Supply Chains? Focus on the Western Mediterranean Region

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In March 2020 the World Health Organization (WHO) declared COVID-19 a pandemic. Since then, its spread worldwide has entailed unprecedented health, economic and social consequences for today's economies. People speak of economic shock, thus implying a major economic crisis in the mid- and long-term.

According to a recent survey by the McKinsey consulting firm, three main scenarios could emerge: a rapid recovery, a world slowdown, and a recession caused by the COVID-19 pandemic. Indeed, the scope of the economic damage caused by the COVID-19 pandemic will depend on the following conditions: how quickly the spread of this virus is prevented, in other words, the effectiveness of vaccine deployment; the efficiency of governments' economic recovery measures but also the capacity to develop joint actions at a European level, for instance; and the degree of financial and social support of governments for the most affected sectors and the most vulnerable people.

At a global scale, the COVID-19 pandemic has created disruptions both to the supply and demand that are reflected in all logistical chains. Following the closure of factories in China in the different industrial sectors (car, aeronautical, textile...) during the first quarter of 2020, a disruption has been seen throughout the supply chain all over the world. The bullwhip effect² has been noted in the supply chain, mainly in the food and drug sectors.

This article seeks to shed light on the impact of the COVID-19 pandemic on the global supply chains. It focuses mainly on the Mediterranean region as a major maritime route connecting Asia to Europe and therefore as one of the major trade channels in the world economy. The paper is divided into two parts. The first provides a general insight into the impact of the COVID-19 pandemic on the world supply chains and the second looks at the Western Mediterranean region and the role of ports in the global supply chains following the changes brought about by the COVID-19. We introduce the concept of digital competition and thus put forward some recommendations to the Western Mediterranean ports in order to improve their strategic position in the global supply chains in the post-COVID-19 era.

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² In logistics, the bullwhip effect refers to the difficulties found in assessing the demand of each actor of the supply chain when the volumes of orders fluctuate because of the up/down disruptions. The difficulties found by each link in the supply chain to determine its real demand for products are at the origin of the bullwhip effect in logistics. This lack of visibility compels enterprises to allocate their resources and build up stocks without taking into account the context/changes that have taken place as a result of a pandemic, an economic geopolitical crisis, and so on.

The COVID-19 Pandemic Revealing the Weakness of the Globalised Supply Chains

Understanding the Global Supply Chains

The COVID-19 has revealed the weakness of the world logistics system. Indeed, the accelerated globalisation of the economy in the last 20 decades and the growing internationalisation of exchanges have contributed to the establishment of vast and complex supply chains. These depend on distant supply sources that are often difficult to control in contexts of health crises such as the COVID-19. Let's take as an example the pharmaceutical industry: according to the Académie nationale de pharmacie in France, 80% of the active principles used in the world would be currently manufactured in China, India and some Southeast Asian countries (Académie nationale de pharmacie, 2020). The geographical dispersion of these supply sources is bound to disrupt the activities of the actors at the bottom of the pharmaceutical industry, closest to the consumer markets.

In the last few decades, the facilitation of exchanges and the scale economies provided by containerisation (over 20,000 twenty-foot equivalent units [TEU] on a single container ship in 2020 compared to 8,500 TEU in the early 2000s) help reinforce the base of the internationalisation of trade. In addition, there is an ongoing research on optimisation of stocks from the supplier to the final client as well as an emphasis on the comparative advantages of each territory in the world (accessibility to raw materials, cost of low-skilled labour, industrial cluster such as Shenzhen, which accounts for half of the world production of mobile phones, and so on). As incredible as it may seem, the only objective of these strategic choices for the vast supply chains that are always more internationalised is to offer the final client products at increasingly competitive prices.

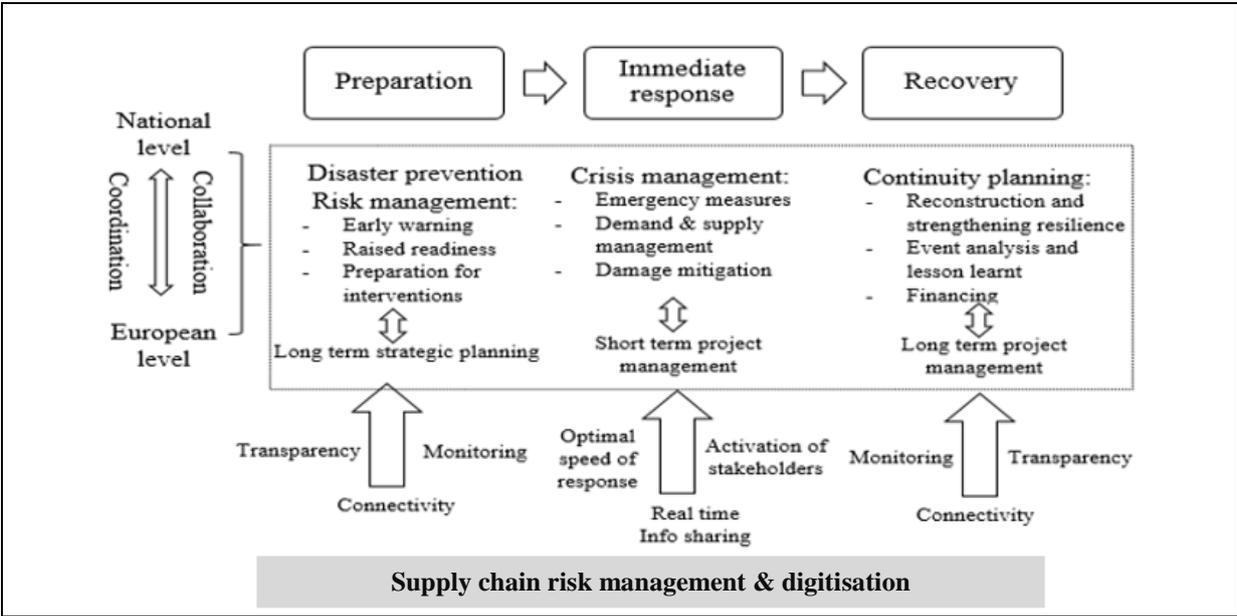
The post-COVID-19 crisis era is likely to question the dependence of modern economies on distant overseas suppliers, giving the impression of a loss of economic and industrial autonomy. Companies such as Intel, Proctor & Gamble, General Motors and Walmart are well prepared for the potential disruptions of their international supply chain. They all have a protocol concerning the decisions to make when an unexpected crisis occurs.

Introducing Supply Chain Risk Management

The notion of risk management is defined as the probability of an event/incident occurring. In a supply chain, this might concern diverse hazards (ruptures in suppliers, peak demand, lack of shipping capacities, and so on). These repercussions, recognised by the literature, are often formalised by the bullwhip effect concept. The COVID-19 pandemic has revealed the vulnerability of the supply chains faced with the need to anticipate and model risks before they occur.

From this point of view, the new digital technologies, such as the Internet of things (IoT), cloud computing, artificial intelligence, machine learning, 5G, and so on, can help better integrate supply chain risk management in the supply chain design. These technologies could in the future notably improve the visibility of flows within the supply chain. The increased connectivity and visibility of the international supply chain would enable the supply chain actors to assess and anticipate the risks. Such proactivity is necessary to deploy the appropriate strategies to respond to a “pandemic”-type crisis. The figure below features a conceptual framework enabling the integration of the risk management notion and how to prepare thanks to the contribution of digital technologies:

Figure 1: The role of supply chain risk management and digitisation



Source: Prepared by the author

Focus on the Western Mediterranean Region

Towards a Smart and Inclusive Regionalisation of the Mediterranean Economies

The Mediterranean is considered an economic area marked by great disparities in terms of economic development between the two shores. With its 450 million inhabitants, it is one of the largest consumption basins. Its presence on the Asia-Europe sea route gives it a status of a sea of transit and place of passage of flows aimed at the northern range ports. The current crisis puts on the agenda of the economic policies of Mediterranean countries the issue of the economic regionalisation and spatial reorganisation of the value chain for certain strategic sectors with strong potential in terms of R&D but also of outlets in the Mediterranean during the post-COVID-19 era.

We should note that, since the emergence of the COVID-19 pandemic, the actors of the pharmaceutical industry have been concerned about the weak level of control of the logistical flows for the active principles in particular. Although R&D and industrial production are still present in Europe, the production of the active principles has long been relocated especially in China and India. In this respect, some countries including France have launched industrial projects aimed at relocating some links in the value chain of the pharmaceutical industry. Greater coordination at the Euro-Mediterranean level will be necessary to entrench these regionalisation/industrial relocation strategies.

Towards Digital Cooperation between the Western Mediterranean Ports

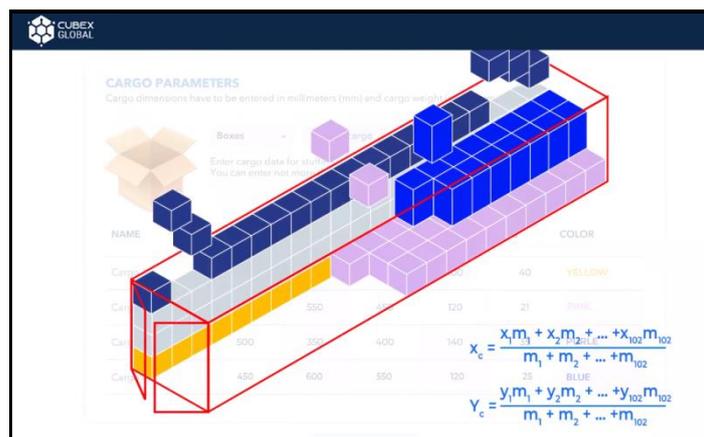
Cooperation in terms of research, development and innovation (R&D&I) focused on digital technologies and their capacity to question the existing ecosystems could be formalised under the concept of “digital cooperation”. The spearhead of this model of cooperation lies in the capacity of the actors to communicate and share data and later bring together innovative initiatives with an ecosystemic approach enabling the emergence of smart ports.

Digital cooperation based on experimentation with technological solutions will undoubtedly develop very quickly in the coming years. The COVID-19 crisis and its bullwhip effects on the international supply chains seem to strengthen the resilience of the ports and their ecosystems. This resilience could, with time, boost the innovation processes and the development at scale of new technologies (digitisation, automation, optimisation).

Recently, OneConnect Financial Technology Co., in partnership with China Merchants Group, has launched the platform project to enable exchanges and international logistics based on the blockchain technology. In a pilot test, 200 TEU were exchanged with the partner Chinese ports. The technology linking the ports has reduced the logistical import and export processes from five to seven days to only two days. The shipping and tariff costs for the enterprises have also decreased by 30% (Port Technology, 2020). Another example is that of the American enterprise CUBEX GLOBAL,³ which has developed a marketplace enabling it to propose cargo capacities available inside the containers. An optimisation algorithm providing a 3D view and visual representation of optimal container internal loading.

Figure 2: Optimisation model developed by CUBEX GLOBAL

³ <http://cubex.global/web/index.php#>

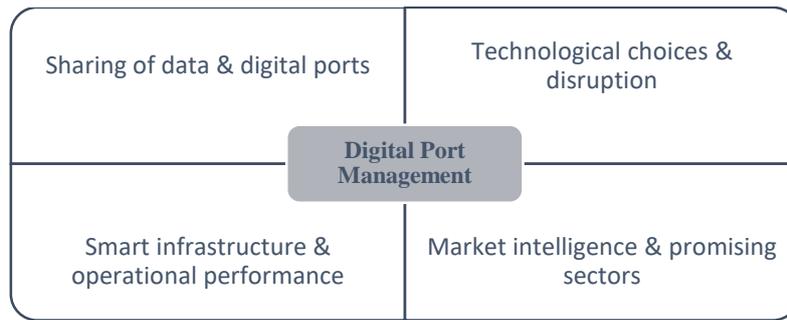


Source: CUBEX GLOBAL 2020

This marketplace has the advantage of optimisation of loading ratio of the containers and consequently of the ships for better productivity (economy of scale) and better environmental performance (reduction of externalities of maritime transport). This solution could in the long term be extended to the case of empty containers by offering this visibility in real time thanks to the digital twin of the container but also by extending its application to port terminals. In the Mediterranean, North-South trade imbalances at the level of maritime transport can be seen in the volume of empty containers moved that affect the optimisation and profitability of port operations. Solutions like the aforementioned can provide performance and productivity gains for the port terminals in the Mediterranean.

Digital twins in the ports also offer a new field of deployment of advanced digital cooperation between the port communities. A digital twin is a replica of the port and its facilities enabling optimisation of port operations, anticipation of the arrival of the ships and more globally the reduction by over 10% of the costs of port operations. Northern range ports such as Rotterdam and Antwerp have already initiated pilot projects exploring the potential of digital twins. Solution integrators, such as those supplied by Bosch, enable the construction of tailored solutions for port communities. The ports of the Mediterranean must encourage the emergence of ecosystems devoted to innovation to accelerate port operation digitisation projects. In this respect, the Med Ports Association is an initiative bringing together 23 ports of the Mediterranean at a regional scale. Initiatives more focused on the technological and digital sections must be developed prioritising a bottom-up approach; that is, based on the needs of clients, ship-owners and shippers.

Figure 3: The pillars of digital cooperation



Source: Prepared by the author

Conclusions and Recommendations

In this article, we have introduced some lessons drawn from the current COVID-19 pandemic and its impact on the global supply chains. Shaped to meet the challenges of optimisation and scale economies, the latter have so far rarely included risk management in the configuration of logistical networks. Since the appearance of the pandemic in early 2020, logistics professionals and researchers agree that a transition towards more resilient and increasingly digitised supply chains would enable risk management to be anticipated. This anticipation would enable prevention of disruptions along the supply chain in the case of pandemic or crises of a different nature (geopolitical, economic, and so on).

In this new logic, large sea ports and regional ports will have to work together in an ecosystemic approach. A mid- and long-term strategic planning is necessary between the ports of the Mediterranean. Innovation, R&D and scientific cooperation must be the pillars of this new port management model to be implemented, in which cooperation and competition must coexist in order to optimise the gains of each actor while seeking an optimal collective result at the level of the Western Mediterranean region.

Finally, we can formulate the following recommendations for the ports of the Mediterranean:

- Encourage port initiatives that prioritise a bottom-up approach combining strategic voluntariness of the ports, smart cooperation and open innovation.
- Accelerate the digital transformation of the port ecosystems in the Mediterranean.
- Foster the development of short sea shipping corridors in the Western Mediterranean including the large maritime ports and regional ports from the two shores of the Mediterranean.
- Promote shared port services and a door-to-door logistics to attract ship-owners.
- Strengthen the attraction/connectivity of the port hinterlands by proposing innovative logistical services/multimodal logistical poles/innovation clusters.

References

- Académie nationale de pharmacie.** (2020). Complexité de la chaîne d’approvisionnement pharmaceutique [PowerPoint slides]. Retrieved from https://www.acadpharm.org/dos_public/DULIERE_Complexite_de_supply_chain_en_pharmacie_V2.pdf
- Berger, H., Kang, K., & Rhee, C.** (2020, March 20). Blunting the Impact and Hard Choices: Early Lessons from China. *IMF Blog*. Retrieved from <https://blogs.imf.org/2020/03/20/blunting-the-impact-and-hard-choices-early-lessons-from-china/>
- Chinese Customs.** (2020). *Monthly Statistics*. General Administration of Customs (People’s Republic of China). Retrieved from <http://www.customs.gov.cn/customs/302249/302274/302278/302280/index.html>
- Deloitte and China Chain Store & Franchise Association.** (2020). Retrieved from (in Chinese) <https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/consumer-business/deloitte-cn-cb-ccfa-survey-covid-19-zh-200318.pdf>
- Fulconis, F., & Paché, G.** (2020, March 2). Coronavirus : un révélateur de la fragilité du système logistique mondial. *The Conversation*. Retrieved from <http://theconversation.com/coronavirus-un-revelateur-de-la-fragilite-du-systeme-logistique-mondial-132780>
- Institute for Supply Management.** (2020, March 11). COVID-19 Survey: Impacts on Global Supply Chains. Retrieved from <https://www.instituteforsupplymanagement.org/news/NewsRoomDetail.cfm?ItemNumber=31171&SSO=1>
- International Monetary Fund.** (2020, March 4). IMF Makes Available \$50 Billion to Help Address Coronavirus. Retrieved from <https://www.imf.org/en/News/Articles/2020/03/04/sp030420-imf-makes-available-50-billion-to-help-address-coronavirus>
- McKinsey & Company.** (2020). COVID-19: Implications for business. Executive Briefing. Retrieved from <https://www.mckinsey.com/business-functions/risk/our-insights/covid-19-implications-for-business>
- National Bureau of Statistics of China.** (2020, 17 March). Total Retail Sales of Consumer Goods Went down by 20.5 percent in the First Two Months of 2020. Retrieved from http://www.stats.gov.cn/english/PressRelease/202003/t20200317_1732694.html
- National Bureau of Statistics of China.** (2020, March 17). Investment in Fixed Assets from January to February 2020. Retrieved from http://www.stats.gov.cn/english/PressRelease/202003/t20200317_1732659.html
- National Bureau of Statistics of China.** (2020, March 17). Industrial Production Operation in the First Two Months of 2020. Retrieved from http://www.stats.gov.cn/english/PressRelease/202003/t20200317_1732640.html

Organisation for Economic Co-operation and Development. (2020). Interim Report March 2020: Coronavirus: the World Economy at Risk. *OECD Library*. Retrieved from https://read.oecd-ilibrary.org/economics/oecd-economic-outlook/volume-2019/issue-2_7969896b-en#page1

Orlik, T., Rush, J., Cousin, M., & Hong, J. (2020, March 6). Coronavirus Could Cost the Global Economy \$2.7 Trillion. Here's How. *Bloomberg Economics*. Retrieved from <https://www.bloomberg.com/graphics/2020-coronavirus-pandemic-global-economic-risk/>

Port Technology International Team. (2020, November 25). OneConnect and China Merchants Group launch 'linked port' blockchain project. *Port Technology*. Retrieved from <https://www.porttechnology.org/news/oneconnect-and-china-merchants-group-launch-linked-port-blockchain-project/>

Ruiz Estrada, M. A. (2020, February 28). Economic Waves: The Effect of the Wuhan COVID-19 on the World Economy (2019-2020). *SSRN*. Retrieved from https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3545758_code450188.pdf?abstractid=3545758&mirid=1

United Nations Conference on Trade and Development. (2020, 8 March). Coronavirus could shrink global FDI by 5% to 15%. *UNCTAD*. Retrieved from <https://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=2299>

World Bank. (2020, March 3). World Bank Group Announces Up to \$12 Billion Immediate Support for COVID-19 Country Response. Retrieved from <https://www.worldbank.org/en/news/press-release/2020/03/03/world-bank-group-announces-up-to-12-billion-immediate-support-for-covid-19-country-response>

Yi, H., Lin, C., Wang, P., & Xu, Z. (2020, March 23). Saving China from the coronavirus and economic meltdown: Experiences and lessons. *Vox EU CEPR*. Retrieved from <https://voxeu.org/article/saving-china-coronavirus-and-economic-meltdown-experiences-and-lessons>